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FLOODPLAIN MANAGEMENT STUDY

BLACKBERRY CREEK AND TRIBUTARIES

KANE-KENDALL COUNTIES, ILLINOIS

JUNE 1989

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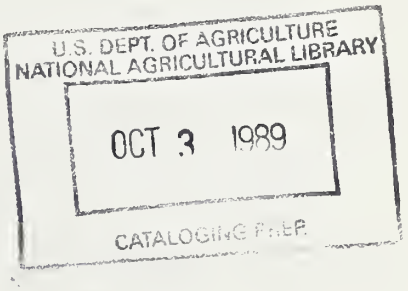

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INTRODUCTION

This study defines the flood characteristics of Blackberry Creek and its tributaries which include Lake Run, East Run, and other unnamed tributaries. The existing flood hazard to buildings located along the studied area was determined and damages were calculated for all buildings in the indentified floodplain. These damages were calculated for the estimated flood peaks from both 1987 land use conditions and projected 2005 land use conditions.

Appendix F summarizes the flood hazard for all surveyed buildings by relating the existing building elevations to the calculated floodwater elevation for the ten percent, one percent, and 0.2 percent chance flood. Both the 1987 and the 2005 flood elevations are shown in Appendix F. This appendix has been published under separate cover with copies provided to the City of Aurora, City of Montgomery, Kane County, Kendall County, and IDOT Division of Water Resources. This information can be used to determine by individual property, the deptn of flooding and possible floodproofing measures that would reduce damages.

Many areas of Illinois are subject to flood damages with some of these areas suffering increasing damage because of loss of natural storage areas and increased urbanization. To identify and quantify these damages, the Illinois Department of Transportation, Division of Water Resources (DWR) has entered into agreements with both the Soil Conservation Service (SCS) and the Army Corps of Engineers to do detailed evaluations throughout the State of Illinois. A joint coordination agreement between DWR and SCS was executed on April 30, 1976, and revised in December 1978 which called for SCS to provide technical assistance in carrying out these flood studies. These studies are carried out in accordance with Federal Level Recommendation 3 of "An Unlimited National Program for Floodplain Management", and Section 6 of Public Law 83-566. This study of Blackberry Creek and Tributaries was initiated through the use of a Plan of Work in January 1986 by the SCS and DWR. The costs of this study were jointly funded by SCS and DWR. DWR provided detailed contour maps for use in defining floodplain areas. The City of Aurora provided detailed contour maps which were used in the development of the hydrology model.

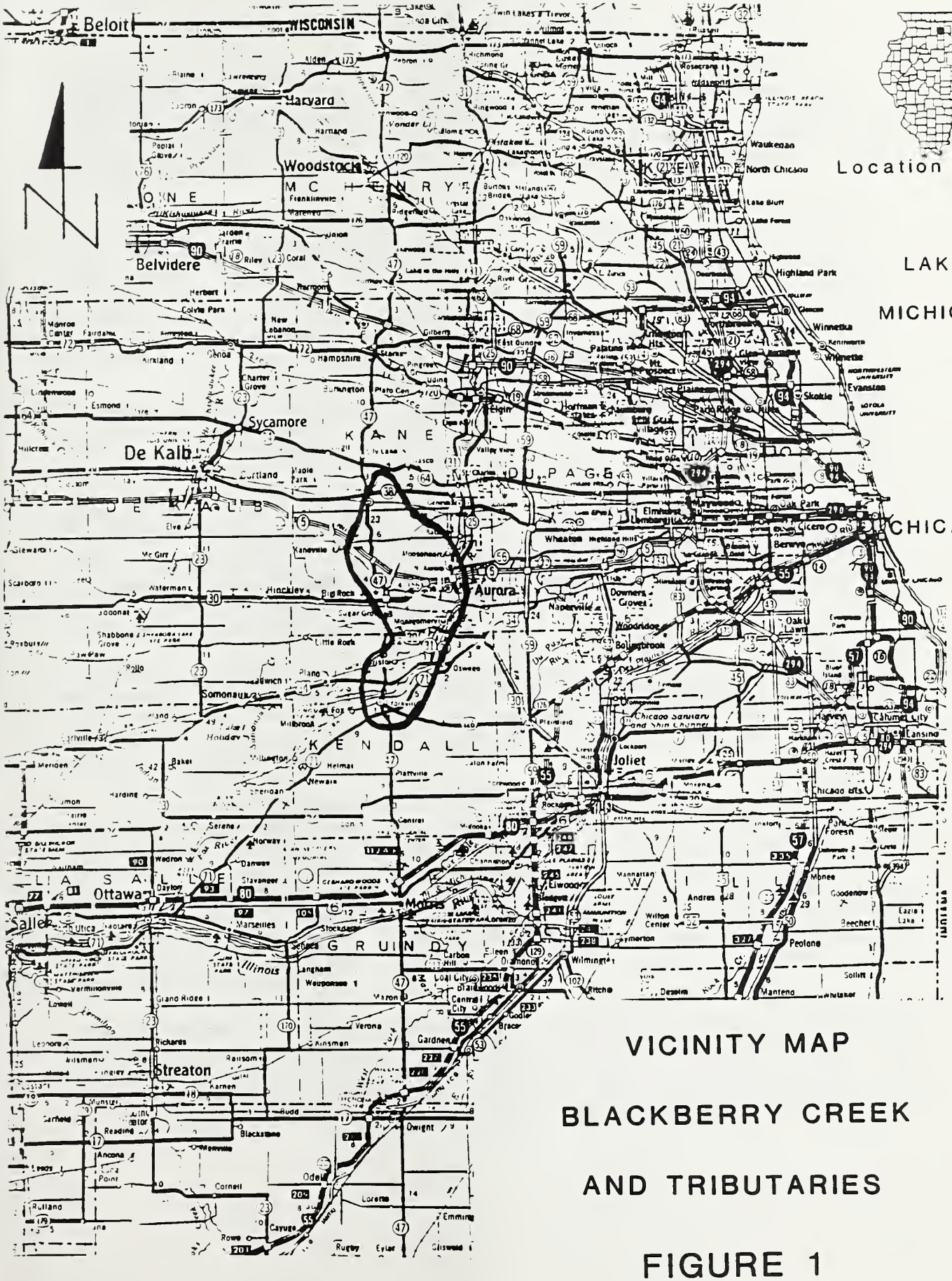
During the July 1983 flood on Blackberry Creek, several residential properties in Aurora, Montgomery and unincorporated Kendall County were damaged. Many of these buildings were not shown as being floodprone on the existing flood insurance maps. The Army Corps of Engineers prepared a Section 205 Initial Appraisal Report for the Cherry Hills Subdivision of Aurora in June 1984 (Reference 1). That report stated that Blackberry Creek floodwater did cause damage in 1983 and FEMA was notified that their existing maps were not correct at the location studied.

This floodplain management study is based on new hydrology using the TR-20 computer program (Reference 8) and new valley sections collected by DWR for use in the WSP2 model (Reference 9). This evaluation shows significant differences in flood elevations and peak flows from the current Flood Insurance Studies (Reference 2, 17, 18). It is estimated that 90 buildings are subject to flood damages by the 1% chance flood. Average annual damages to buildings is estimated to be $60,600. The largest percentage of these floodprone buildings are located in the City of Aurora.

Local governments and residents would like the existing problems reduced and are concerned that future development will increase their flooding problems. A local steering committee was formed that provided guidance throughout the study period. Many local citizens also provided input into the study effort. This report describes some structural methods evaluated to reduce existing damages and summarizes the impacts of projected (2005) future development on existing buildings.

The report points out that maintenance of 13 existing natural storage areas in the watershed are critical. The loss of these storage areas would increase peak flows by 10% to more than 200%. See Appendix E for the location and size of each storage area.

None of the structural alternatives evaluated show a favorable benefit/cost ratio and thus would not be subject to funding by a federal agency under current rules and regulations. The maps and profiles included in this report are adequate for floodplain regulation along the streams studied. Local governments and DWR will determine whether they should be submitted to FEMA for updating of existing FEMA maps.



VICINITY MAP

BLACKBERRY CREEK

AND TRIBUTARIES

FIGURE 1

DESCRIPTION OF STUDY AREA

Blackberry Creek Watershed is located in Kane and Kendall Counties approximately 40 miles west of the Chicago Loop. Blackberry Creek is a perennial stream that originates north of Elburn, Illinois. It outlets into the Fox River at Yorkville and has a total drainage area of 73 square miles. The hydrologic sub-watershed number is 07120007-020. The watershed is shown on Figure 6.

This Floodplain Management Study identifies the floodplain along Blackberry Creek from Yorkville to Highway 38 northeast of Elburn, a distance of 33 miles. Also identified are the floodplain areas along East Run, 2.2 miles; Lake Run, 5.1 miles; Lake Trib, 1.5 miles; Lateral C, 3.0 miles; Lateral D, 2.4 miles; and Lateral X near Prestbury, 1.4 miles. Total miles of stream studied equals 48.6 miles. The 100-year floodplain equals 2400 acres with less than 5% currently used as urban development.

The primary urban areas subject to damage by the 1% chance flood are located in Aurora and Montgomery. The Willowbrook Subdivision, located about three miles south of Montgomery, includes many buildings surrounded by Blackberry Creek floodwater with only a limited number being inundated by floodwater.

The area along I-88 (East-West Tollway) is expected to be subject to considerable development pressure over the next 20 years. Most of the land east of Fox River along I-88 has been developed for commercial use in the last ten years. The Kane County Planning Department provided input into the expected 2005 developed area shown on Figure 5. Figure 5 also shows the 1987 developed areas in the watershed.

The formation of the soils in this watershed was influenced by the glaciers that covered the area during prehistoric time. The topography varies from level and nearly level to rolling with numerous small depressions. The parent materials are loess, glacial till, lacustrine, outwash alluvium, and organic deposits (Reference 12, 13).

Drainage characteristics of the soils include: well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. Since water is removed from the poorly-drained soils so slowly that free water remains at or near the surface during most of the year, maintenance of existing drainage is necessary for crop production. The very poorly drained soils have severe limitations on both agricultural and non-agricultural uses. Characteristics influencing the drainage of soils includes a seasonable high water table, slowly pervious layers within the soil profile, seepage, or a combination of these.

The well-drained soil series include Dodge, Dresden, Fox, Miami, and Proctor. The moderately well-drained soils include Saybrook, Varna, and Waupecan. The somewhat poorly drained soils include Brenton, Elburn, Flanagan, Lisbon, and Millbrook. The poorly drained soils include Drummer, Harpster, and Will. The very poorly drained soils include Houghton, Lena, and Peotone.

The climate of the watershed is classified as humid continental which is characterized by warm summers, cold winters and relatively large daily, monthly and yearly variations in both temperature and precipitation. Average annual precipitation is 34.7 inches. March through October precipitation averages 3.4 inches monthly. Mean annual runoff is approximately 10 inches or about 29 percent of total precipitation (Reference 5 and 13).

During January, normally the coldest month, temperatures range from a normal maximum of 30 degrees F to a normal minimum of 12 degrees F. During July, normally the warmest month, temperatures range from a normal maximum of 84 degrees F to a normal minimum of 62 degrees F. The maximum temperature of 90 degrees F is exceeded on 30 days in a normal summer. The average frost-free season is 160 days (Reference 5 and 13).

Based upon the 1980 Census of population, the populations of Kane and Kendall Counties were 278,405 and 37,202 respectively. From the period 1970 to 1980 Kane County registered a 10.9 percent increase in population while Kendall County experienced a 41.1 percent increase in growth (Reference 14).

The unemployment rate within the study area has been below state and national averages. According to the Illinois State Employment Security Office, the 1987 unemployment rate for Kane County was 6.1 percent and Kendall County was 5.5 percent versus a 6.2 and 7.4 for the United States and the State of Illinois respectively.

The per capita income for Kane and Kendall Counties are near the State of Illinois and national averages for 1987 according to the Bureau of Economic Analysis. Kane County registered per capita personal income of $11,359, while Kendall County was reported to be at $10,786, as compared to $11,012 and $11,572 for the United States and State of Illinois respectively.

It is estimated that the current population in the watershed is 18,500 with most located in the communities of Aurora, Montgomery, or Sugar Grove.

NATURAL VALUES

The Blackberry Creek watershed is located in an area which is getting some urban development pressure. Currently the predominant land use is agricultural, it is expected that this will still be the case in 2005. The following table shows the area currently developed, estimated area in permanent vegetation (woods, pasture, and wetlands), and the area being used for agricultural production. See Figure 5 for location of the developed areas.

TABLE 1
PRESENT AND PROJECTED LAND USE

LAND USE	APPROXIMATE AREA (% OF WATERSHED)	
type	1987	2005
Urban	15%	27%
Permanent vegetation	13%	11%
Agriculture	72%	62%

Most of the floodplain land identified along Blackberry Creek in Kendall County is currently used as pasture or woods. A limited amount is being used for crop production and a small portion is built up in residences. The stream in this lower portion of the watershed meanders and in many areas has natural pools that support game fish. Upstream in Kane County near Montgomery and Aurora, a larger portion of the floodplain is used for agricultural production and the number of buildings located in the floodplain increases. Portions of the floodplain have been modified to incorporate development of parks and golf courses.

Upstream of Sugar Grove the drainage area becomes small enough, less than 20 square miles, that the stream would be classified as intermittent. Existing land use for the upstream reaches is a mix of woods, pasture, cropland, and residential communities. New development is occurring in the existing wooded land located in the rolling ground drained by Blackberry Creek.

Most of the tributaries evaluated have been previously modified to improve agricultural drainage. Lake Run and East Run both show evidence of having been deepened and straightened. The same is true for Lateral C and portions of Lateral D. The natural floodplain along these laterals do provide significant storage during large runoff events. Future development along or near these channels should protect these storage characteristics.

Over 90 percent of the agricultural land in the watershed is classified as prime farmland. The Food Security Act analysis of Blackberry Creek watershed shows 3300 acres or 7% of the drainage area is eroding at a rate greater than five tons per acre per year. The local Soil and Water Conservation Districts are working with the land operators to reduce erosion on these lands. It is expected that 75% of these areas will have treatment measures and practices in place by 1995.

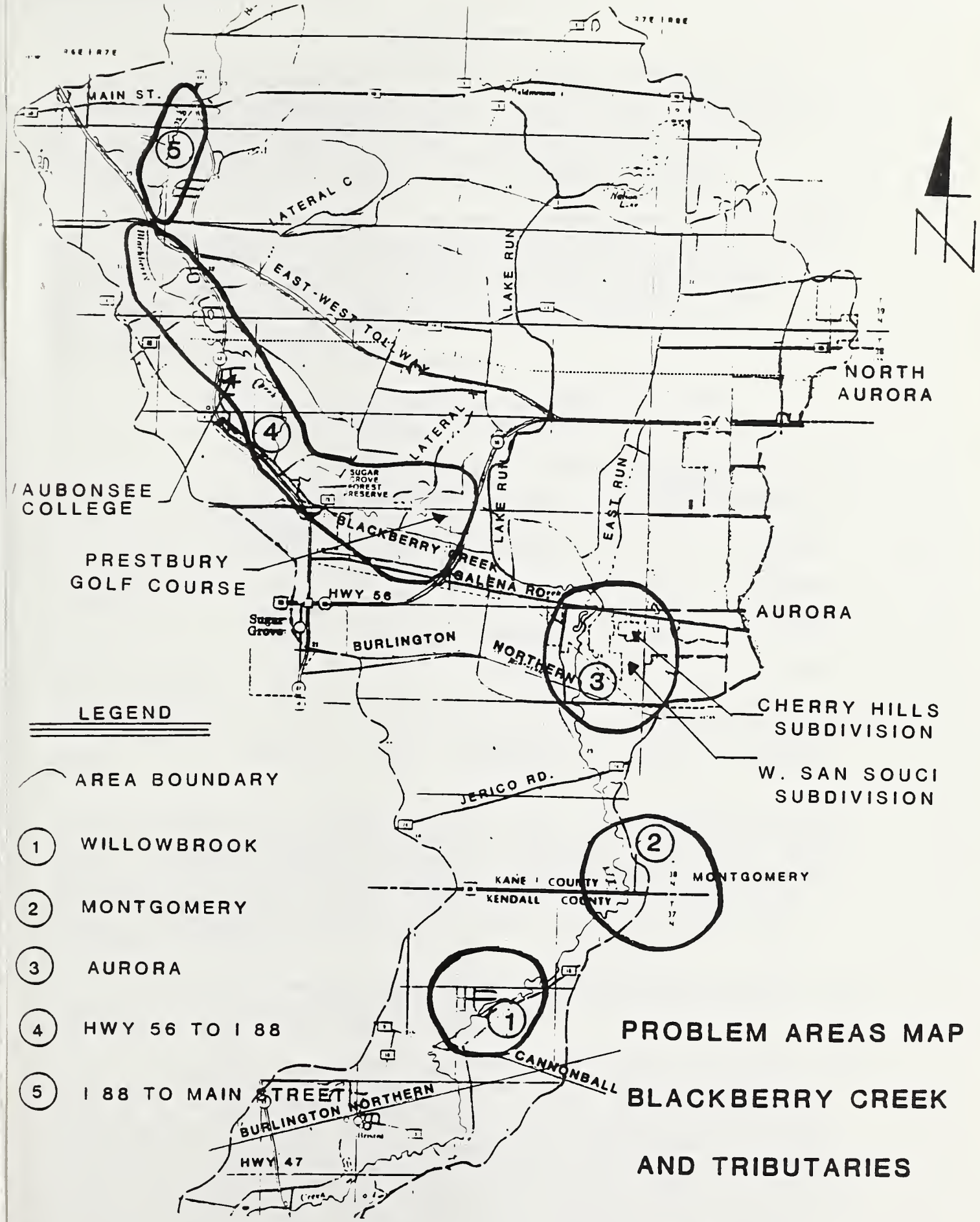
Primary plant communities in the wooded areas are upland hardwood forest and upland and lowland successional communities. Two large wetlands, Nelson Lake and Carson's Marsh, provide very valuable wildlife habitat. These depressional areas also serve as natural reservoirs that reduce peak flows going through them by 90%. The latest inventory by the U.S. Fish and Wildlife Service identifies 1720 acres of the watershed as wetlands (Reference 19). According to Table 9 in An Assessment of the Wildlife and Wildlife Habitat of Kane County, Illinois, Kane County in the 1800's was over 25 percent wetlands (Reference 16). At that time, woodlands covered over 30 percent of the county landscape.

The wooded portion of the watershed is a mixture of native plants such as silver maple, elm, white oak, willow, hawthorne, ash, burr oak, basswood, cottonwood, gray dogwood, and bushes like nannyberry.

A rich variety of wildlife species are associated with the plant communities described above. Wetlands in particular provide very important habitat conditions. In a detailed analysis of habitat types and wildlife abundances, Byers, et al (Reference 16) developed a Basic Wildlife Index that rated habitat types in Kane County. Wetlands (26.79) scored nearly 60 percent higher than the second best habitat type, Riverine Woodlands (16.50), which scored only slightly higher than undistributed (16.29), unaltered greenbelts (10.44), and hayfields (10.04) while cropland (4.29) scored lowest of the nine habitat types studied. All of these habitat types occur within the watershed of Blackberry Creek. Refer to Byers et al (Reference 16) for a detailed description of wildlife and wildlife habitat in Kane County.

The 1981 List of Endangered and Threatened Species of Illinois (Reference 4) cites 39 plant species known to exist in Kane and Kendall Counties that are officially designated as endangered or threatened. That same list cites two species of animals that are designated as threatened. The Indiana Bat, Myotis Sodalis, is listed by the U.S. Fish and Wildlife Service as a federally endangered species for the entire state of Illinois.

No archaeological sites or historical sites have been identified in the areas that would be modified under any of the alternatives evaluated.



PROBLEM AREAS MAP

BLACKBERRY CREEK AND TRIBUTARIES

FIGURE 2

FLOOD PROBLEMS

This study concentrated on the existing urban problems and potential for increased damages as new development occurs. The existing buildings in areas known to be subject to floodwater damage or suspected to be in floodprone areas were surveyed by IDOT-DWR in 1987. They surveyed 284 buildings identifying the first floor elevation, the elevation water can enter the building, and the kind of building for use in economic evaluation.

Figure 2 shows the five different areas where surveyed properties are located. Most of these properties are residences but some garages and a few commercial buildings were also surveyed. The following table summarizes the number of buildings evaluated in each area along with the number subject to damage by the 1% chance flood under present and future runoff conditions. Also identified is the estimated average annual damage expected to occur in each area for these flood conditions.

TABLE 2

PROPERTIES FLOODED AND ESTIMATED DAMAGE BY 1% FLOOD
1987 and 2005 Conditions

		Present Condition (1987) Damage		Future Condition (2005) Damage	
Location	Buildings Surveyed	# Bldg	$ Damage	# Bldg	$ Damage
Willowbrook	45	10	157,500	10	160,000
Montgomery	55	23	436,800	23	436,800
Aurora	155	56	1,010,000	56	1,010,000
Hwy 56 to I-88	25	1	1,600	1	1,600
Upstream I-88	4	0	0	0	0
TOTAL	284	90	1,605,900	90	1,608,400

The most recent large flood occurred in July 1983. This event had a rainfall of over 5 inches in Aurora but less than 4 inches fell on the watershed near Elburn. The peak discharge at the Yorkville gauging station for this flood was measured to be 2060 cfs. This was the largest recorded peak discharge in over 20 years of stream records. Water flooded several buildings in the Aurora and Montgomery areas and many of the Willowbrook residences were surrounded by floodwater.

It is estimated that damages from this flood exceeded $300,000. It is estimated that under current runoff conditions a flood of this magnitude could be expected to occur about once every 35 years.

Area 1, Willowbrook, is a subdivision located on the banks of Blackberry Creek with local residents enjoying the natural setting of a perennial stream flowing past their houses. The stream contains pool areas in which small mouth bass can be caught. However, during major storm events water exceeds the banks of the stream and flows through the subdivision causing several houses to be completely surrounded by floodwaters. The access road, Willow Road, is overtopped and during larger events the entire subdivision west of the creek cannot get to or from the main road. Another concern of the local residents is the increased frequency of water overtopping the streambanks. This appears to be due to the filling in of the channel with sand and sediment, and the increased peak flows carried by the stream.

Area 2, in Montgomery, is the western portion of the community that is primarily located along the Fox River. This portion of Montgomery is subject to two types of flooding when peak flows are high on Blackberry Creek. The first type is like that described for Willowbrook. The second type of flooding is unique because of the flat terrain along Blackberry Creek. Once floodwater reaches elevation 662.3 at the existing lake along Blackberry Creek north of Montgomery, water flows out of the lake towards the southeast. This water flows overland through a portion of Montgomery until it flows into the Fox River. It is estimated that this flow into Montgomery does not occur until the 6% chance or greater event occurs. During the July 1983 flood, many buildings were flooded by water coming out of Blackberry Creek valley into this overflow area.

Area 3, in Aurora, is the portion of Aurora located between the Prairie Path and Galena Road on the west side of the community. This portion of Aurora is subject to: a) limited damage from floodwater off the local drainage called Chain of Lakes Tributary, and b) moderate to heavy flood damages when Blackberry Creek flows over Galena Road. When floodwater upstream of Galena Road exceeds elevation 672.5, about the 10% chance, water flows overland through the Cherry Hills and W.San Souci subdivisions, over the Prairie Path and ponds upstream of the Burlington-Northern Railroad tracks. This area acts as a reservoir and during the 1% chance event, stores 360 acre/feet and backs water up into the Cherry Hills and W. San Souci subdivisions. Residences located in both Cherry Hills and W. San Souci subdivisions are subject to floodwater damages. About two-thirds of the evaluated residential damages occur in this area with an estimated 56 buildings subject to damage due to the 1% chance flood.

Streets in the Cherry Hills Subdivision are quite low and depend on a community pumping plant to empty the stormwater out of the low areas. In 1983, this pump did not work properly and water was stored in the area for several days. The low lands along Blackberry Creek and East Run upstream of Galena Road provide significant storage during major storms. It is estimated that these floodplains store over 700 acre-feet during the 1% event and over 500 acre/feet before Galena Road overtops.

Area 4, Highway 56 to I-88, is a reach that contains numerous scattered residential areas and subdivisions. Only one building surveyed in this area was determined by the study to be subject to damage by the 1% chance. This reach includes Prestbury Golf Course which was severely damaged in 1983. Water nearly covered the entire course with only a few greens not under water. The course was closed for over a month and many of the greens had to be completely resodded because of flood damage. Waubaunsie College, located near the center of this reach, is not subject to floodwater damage to existing buildings.

As this area continues to develop, it is important that the local governments continue enforcement of existing floodplain regulations to prevent any increase in damageable properties.

Area 5, upstream of I-88, is the reach from I-88 to just upstream of Main Street. Fishermans Inn, a local restaurant, is located along Main Street and has had flood damage to the parking lot. This evaluation indicates that none of the buildings surveyed in this area were subject to damage by the 1% chance flood. Floodwater is quite close to several buildings and any blockage of existing flow path or any significant increase in peak flows could result in some buildings being damaged.

The following table summarizes by frequency the evaluated building damage for the Blackberry Creek Watershed under present conditions (1987). See Figure 5 for presently developed areas in the watershed.

TABLE 3

TOTAL DAMAGES BY FREQUENCY
1987 Conditions

Frequency %	Year	Total Buildings	Total Damages (1000 dollars)
0.2	500	189	5328
1.0	100	90	1606
2.0	50	62	857
4.0	25	22	195
10.0	10	5	31
20.0	5	3	8.7

Average Annual Damages = $60,600

The future conditions (2005) were developed to predict runoff and damage conditions. The projected development is shown on Figure 5. Appendix E shows the location and storage presently provided by 13 natural storage areas. This new development is expected to maintain existing valley and depressional storage through compensatory storage. All new developed areas will provide on-site detention reservoirs with a release rate of 0.15 cfs/acre or less. These detention reservoirs are expected to contain at least 2 inches of runoff from all newly developed lands. This amounts to 1.67 acre-feet for each 10 acres developed. See Table 5 for the impacts on peak flows for existing land use if the natural storage is lost.

This evaluation showed future conditions damages increasing slightly and the 100-year profile going up less than 0.2 feet at most locations in the study area. The following table quantifies the total damages for future conditions as evaluated in this study.

TABLE 4

TOTAL DAMAGES BY FREQUENCY
2005 Conditions

Frequency %	Year	Total Buildings	Total Damages (1000 dollars)
0.2	500	190	5340
1.0	100	90	1608
2.0	50	64	938
4.0	25	24	210
10.0	10	6	40
20.0	5	3	9

Average Annual Damages = $63,100

It is estimated that 24 roads are subject to overtopping by the 1987 conditions 1% flood. Only ten of these will be overtopped by the 10% chance flood. Several of these roads will be flooded to a depth greater than one foot, so traffic distruption will occur during the flood event. See Appendix A for detailed information on flood depths by frequency. The damages to the region due to traffic disruption in the watershed was not quantified.

EXISTING FLOODPLAIN MANAGEMENT

Currently, the Cities of Aurora, Montgomery, Sugar Grove, and Yorkville, along with unincorporated Kane County and unincorporated Kendall County, are participating in the Regular Phase of the National Flood Insurance Program (NFIP). This program provides data to the local government so that they can adopt floodplain management measures. Each flood insurance study includes a flood boundary map with a floodway designated to assist the community in enforcing the rules it will use to regulate land use. There are existing flood boundary maps and profiles available for most of Blackberry Creek and the tributaries. These maps and profiles are being used to regulate new construction in the areas subject to flooding.

These existing flood boundary maps did not identify all of the areas flooded during the July 1983 flood (estimated to be a 3% chance flood). Therefore, not all areas subject to flooding by the 1% chance flood have been regulated in the past.

Since the July 1983 flood, the existing hazard to many of the unmapped areas have been recognized by local governments. The communities involved have assisted in the evaluation of the flooding problem throughout this study and recognize that the maps included in this report will probably be used by the Federal Emergency Management Agency (FEMA) to update the flood insurance maps for the communities involved in accordance with guidance from Congress. This report includes both the 100 year (1% chance) floodplain and the 500 year (0.2% chance) floodplain.

In order to provide a national standard without discrimination, the 100 year flood (1% chance) has been adopted by State and Federal agencies as the base flood for purposes of floodplain management measures. The 500 year (0.2% chance) flood is employed to indicate areas of additional flood risk within a community. For all the streams studied in detail, the boundaries of the 100 year and 500 year flood for present runoff conditions have been delineated. These flood boundaries have been determined by using the flood elevations calculated for each valley cross section. Between the surveyed cross sections, the floodplain boundaries were interpolated using topographic maps prepared by DWR. In many cases the 100 year and 500 year flood boundaries are very close together, and only the 100 year boundary has been shown. The boundaries of the floodplains are shown on the floodplain maps at the back of this report.

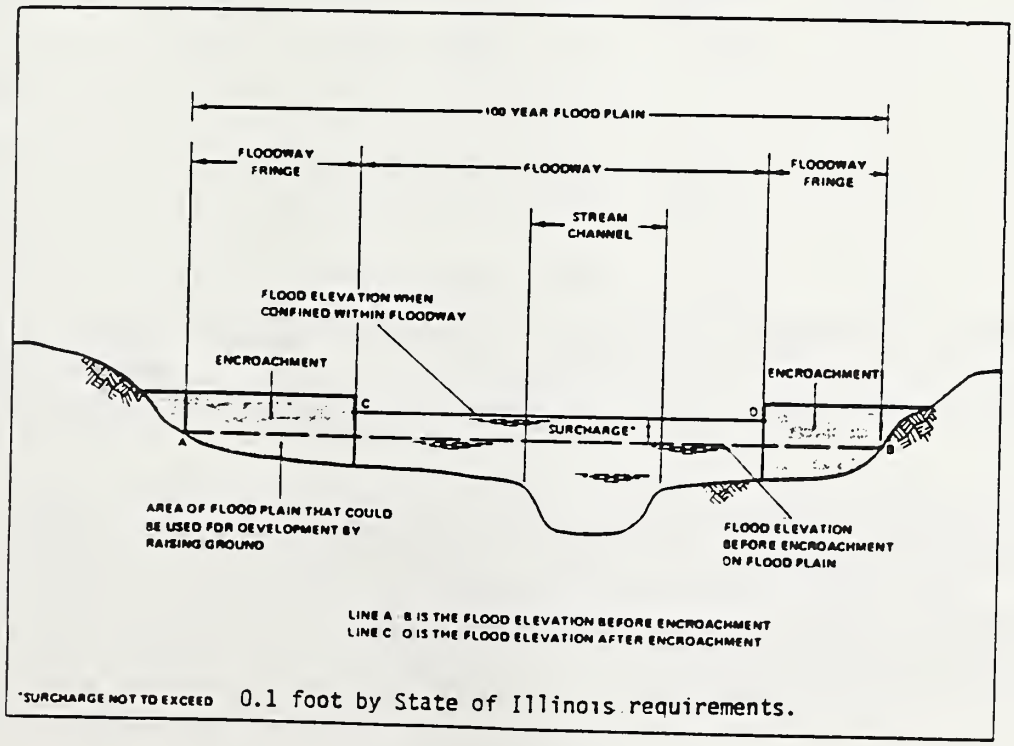
Small areas within the flood boundaries may lie above the flood elevations and therefore not be subject to flooding. However, due to the limiting scale of the topographic maps used to prepare the floodplain maps, such areas are not shown. The profile sheets in Appendix A should be used to ascertain flood elevations for any specific point along Blackberry Creek and Tributaries for present runoff conditions. In addition, Appendix F lists the present and future 10 year, 100 year and 500 year flood elevations for all buildings surveyed in or near the floodplain. Encroachment on floodplains, such as artificial barriers, reduces the water carrying capacity and increases flood heights thus increasing flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from the floodplain development against the resulting increased flood hazard.

For purposes of the NFIP, the concept of a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the 100 year floodplain is divided into floodway and a floodway fringe. The floodway is the channel of the stream plus any adjacent floodplain areas that must be kept free of encroachment in order that the 100-year flood discharge can be carried without a substantial increase in flood heights. In this case, blockage of the adjacent floodplain areas without blocking the channel will result in increasing the flood elevations. The floodway fringe area ie: all the floodplain except floodway, is not required to convey the flows but does act as a storage area on flat streams (See Figure 3 for sketch).

In Illinois, the minimum standard used to define the 100 year floodway is described in the Illinois Revised Statutes of 1973 under 65F, Chapter 19 (Reference 7). In this standard, the encroachment in the floodplain is limited to that which will cause only an insignificant increase in flood heights. The Illinois Division of Water Resources has recommended that the floodway be determined using no more than a 0.1 foot surcharge (Reference 3). The floodway proposed for this study, using the 0.1 foot surcharge, was computed by equal conveyance reduction from each side of the floodplain. (Reference 10).

As shown on the flood boundary and floodway maps, the floodway boundaries were determined at individual cross sections. Between the cross sections the boundaries are interpolated.

The area between the floodway and boundary of the 100 year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the floodplain that could be completely obstructed without affecting the conveyance in such a manner as to increase the water surface elevation of the 100 year flood more than 0.1 of a foot at any point. The typical relationship between the floodway fringe and the floodway are shown in the floodway schematic (Figure 3).



FLOODWAY SCHEMATIC

FIGURE 3

SIGNIFICANCE OF NATURAL STORAGE

The preservation of existing natural storage along the different streams evaluated is of critical importance to residents located in or near the existing floodprone areas. The following table shows the impact of reducing the existing 3900+ acre-feet of storage to approximately 870 acre-feet. Present conditions relate to 1987 land use in the watershed and future conditions are based on projected land use in the 2005 with all new development installing on-site detention basins.

TABLE 5

PEAK DISCHARGES - 1987 AND 2005

Location	Drainage Area	Existing Natural Storage 1/				Reduced Natural Storage 2/	
		1987		2005		1987	
	Sq. Mi.	10 yr	100 yr	10 yr	100 yr	10 yr	100 yr
		cfs	cfs	cfs	cfs	cfs	cfs
Blkberry Ck							
@ mouth	73.4	2200	3420	2330	3460	2550	3775
@ Cannonball	60.0	2170	3340	2280	3360	2750	3900
@ Jerico Rd	56.9	2400	3970	2510	3980	2910	5030
@ Galena Rd	50.8	2340	4350	2450	4350	2800	5480
@ Hwy 56	31.0	1530	3120	1550	3080	1680	3410
@ Hwy 47	21.0	1430	2900	1380	2820	1630	3410
@ Main Str	11.4	940	1800	980	1850	970	2030
@ CNW RR	3.1	550	880	600	930	650	1160
East Run							
@ mouth	4.7	290	430	260	390	420	740
Lake Run							
@ mouth	14.0	640	1000	680	1040	770	1420
@ Seavey Rd	7.3	780	1440	780	1440	850	1510
Lateral X @ mouth	1.9	80	140	60	100	150	260
Lateral C							
@ mouth	6.1	560	1050	610	1130	670	1140
Lateral D							
@ mouth	3.0	340	690	350	640	440	1130

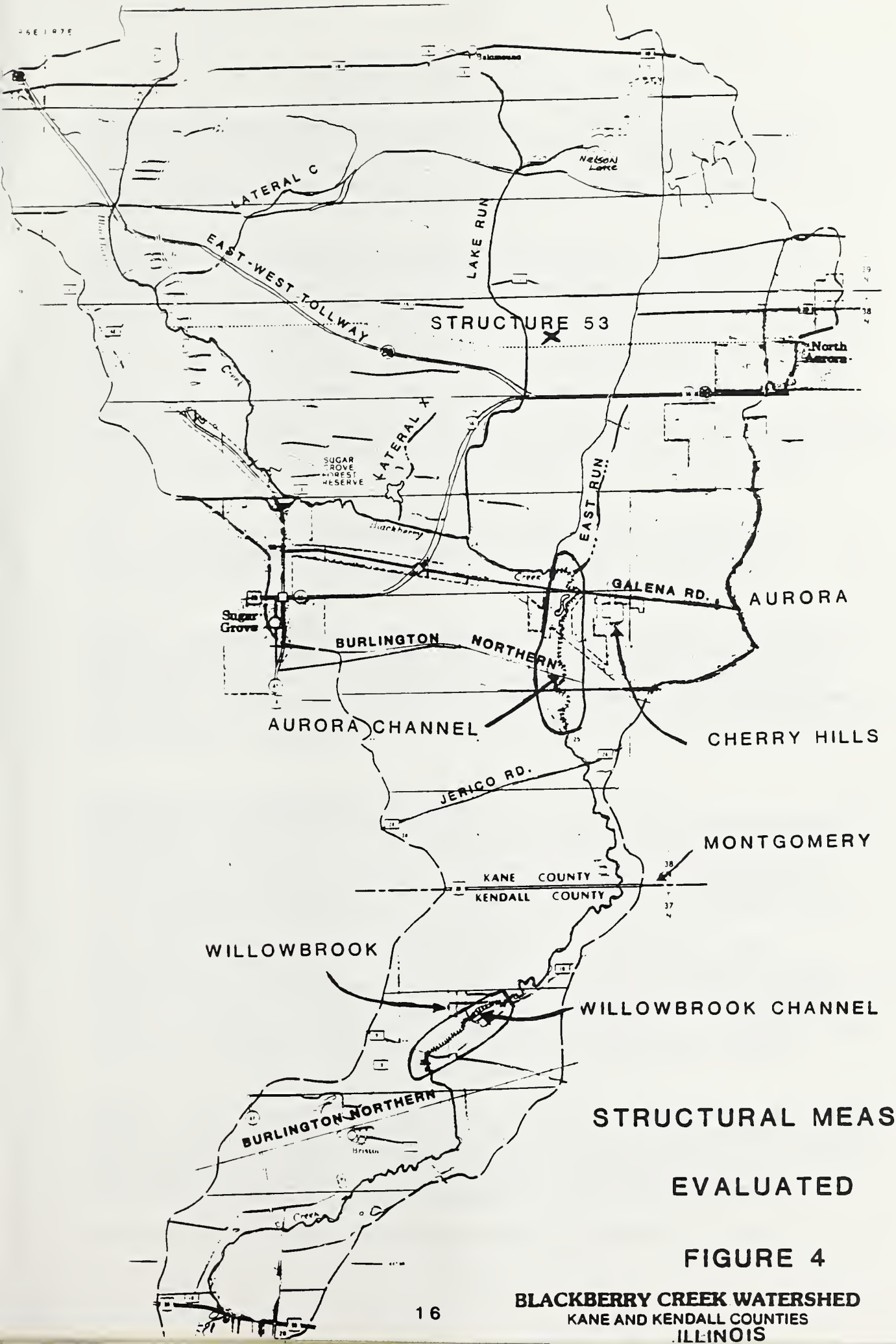
1/ The 13 natural storage areas shown in Appendix E temporarily store over 3900 acre-feet.

2/ This evaluation assumed storage areas 31, 52, & 71 were the only ones maintained, storing approximately 870 acre-feet.

Under present (1987) land use conditions flood flow splits at Galena Road and flows either down the main channel or through Cherry Hills subdivision. Under 1987 conditions, with natural storage, about 980 cfs overtops Galena Raod and flows through the subdivision during the 100 year (1%) chance flood. The reduction of the natural storage as evaluated in Table 5 woudl increase the 1% flow through Cherry Hills to 1600 cfs. It is estimated that for the 10% chance storm, the peak flow from Blackberry Creek through Cherry Hills would increase from 5 cfs to 105 cfs.

The flood flow also splits just downstream of Jericho Road during large storm events. This floodwater flows either down Blackberry Creek or flows toward the southeast through Montgomery into the Fox River. Under present conditions with natural storage, the 1% peak flow into Montgomery and then to the Fox River equals approximately 490 cfs and the 25 year (4%) peak is estimated to be 135 cfs. The reduction of natural storage as used to prepare Table 5 would increase the 1% peak into Montgomery to 1080 cfs and the 4% peak into Montgomery to 305 cfs.

It is estimated that average annual damages to buildings surveyed in the watershed would at least double and might increase by more than four times to individual buildings if the natural storage is reduced as much as shown in Table 5.



STRUCTURAL MEASURES

EVALUATED

FIGURE 4

BLACKBERRY CREEK WATERSHED
KANE AND KENDALL COUNTIES
ILLINOIS

ALTERNATIVES FOR FLOODPLAIN MANAGEMENT

Several floodplain management strategies were evaluated including a) no action, b) non-structural measures, and c) structural measures. A brief description of alternatives follows. None of the structural measures evaluated approached economic feasibility. See appendices C and D for location and costs of the evaluated measures.

Alternative A - Future Without Project (No Action)

Components: This alternative assumes no additional action beyond what is currently being done in the watershed. All new development will be regulated by the City of Aurora, City of Sugar Grove, City of Yorkville, Kane County or Kendall County. The new development would need to meet the existing on-site detention ordinances. These ordinances require all new development to provide at least two inches of storage for the area being developed with a release rate of about 0.15 cfs/acre. Compensatory storage would be provided for any development in an identified floodplain. This would preserve the existing natural storage areas. Existing homeowners in floodprone areas would continue to purchase flood insurance to reduce the financial impact of flooding. Areas currently experiencing flood damages would continue to experience flood damages.

Costs: The costs of this alternative are determined by the number of individuals who purchase flood insurance ($200 + per household per year) and the costs to the local governments for implementation of floodplain regulations.

Effects: The average annual damages would increase slightly, approximately $2500 annually, as peak discharges increase somewhat in response to the additional development. Existing buildings subject to flood damage will continue to be flooded. Depth of flooding by frequency will increase from 0.1 to 0.2 feet. It is estimated average annual damages to existing buildings would increase to $63,100.

Alternative B - Nonstructural Measures

Components: The primary components consist of administrative actions such as zoning, enforcement of on-site detention requirements, working with local homeowners to floodproof basements (estimate 11 buildings)and protecting natural storage areas by requiring compensatory storage. The maps and profiles prepared as part of this report are adequate for revisions of the regulatory maps along the studied streams.

Costs: It is estimated that flood insurance will continue to cost approximately $200/building. The floodproofing of the 11 homes would cost $67,450 with an estimated annual cost of $6,300 including $500 annual O&M. No estimate is made for administration costs of the communities to enforce existing ordinances. This cost estimate for floodproofing assumes existing drives and sidewalks do not need to be modified. Costs will increase considerably if this is not a correct assumption.

Effects: Local residents in floodprone areas will continue to be able to buy flood insurance to cover them for damages over $200 in a given year. The 11 properties where floodproofing measures are installed would all be protected from damage by the 2% (50 year) chance flood. Total benefits to the 11 properties equals $5300. Remaining damages in 2005 equals $57,800.

The Benefit/Cost Ratio for floodproofing the 11 properties is 0.84:1.

Alternative C - Structural Measures

The following describes different structural measures evaluated as part of the study. Since the damage areas are scattered along Blackberry Creek, it was felt that more than one structural measure would be required. Since most of the damages in the Montgomery and Cherry Hills Subdivision of Aurora are primarily due to water getting out of the existing natural valley and flowing overland, it was apparent that either increased channel capacity or reduced peak flow or a combination of both would be needed. At the Willowbrook Subdivision it was apparent that either floodproofing or enlarged channel capacity were the most likely solutions. The following discussion describes the most feasible of these structural measures. See Appendix C for sketches of each measure and Appendix D for detailed cost estimate information. Figure 4 shows the location of these measures in the watershed.

The construction of a levee north of Galena Road was looked at and dismissed because of increased flood discharges downstream of Jericho Road and near Willowbrook. The construction of a levee system in and near Willowbrook would require the removal of at least two existing houses and, the replacement of one bridge. The levees would be over 4000 feet long on both sides of the river. The construction cost of this system would be at least five times as much as could be justified in damage reduction.

Modify 3 bridges near Willowbrook

Components: Clean out under existing railroad bridge south of Cannonball Trail, widen Cannonball Trail bridge by 60 feet and widen Willow Road bridge by 60 feet. This will require the excavation of approximately 13,000 cu. yds. of material, the rebuilding of the two bridges and the reseeding of the disturbed area at each bridge. Total area disturbed is estimated to be one acre.

Costs: The total cost of these measures is $254,000 with average annual costs estimated to be $23,100 which includes OM&R of $1,200.

Effects: Construction of these three bridge modifications will reduce the number of buildings flooded in Willowbrook by the 1% chance flood from 10 to 5. The depth of floodwater for the 10 year flood will be reduced by 0.5 ft to 1.0 ft, depending on location. Average annual damages to the Willowbrook Subdivision would be reduced by $5,750.

The benefit/cost ratio for this element is 0.25:1.

Willowbrook Channel and Bridge Modification

Components: This consists of modifying approximately 7,000 feet of the Blackberry Creek Channel from downstream of Cannonball Trail (sta 37600) to upstream of the Willowbrook Subdivision (sta 44600). Work would consist of widening the existing channel to 60 feet wide with new construction to be done from one side and all disturbed areas reseeded with appropriate vegetation. The existing channel grade will be maintained. The existing bridges at Cannonball Trail and Willow Road will be widened by 60 feet. Total excavation will require the removal of 56,000 cubic yards of material.

Costs: The total cost of this measure is $467,000 with average annual costs estimated to be $42,100 which includes OM&R of $1,800.

Effects: This channel modification will result in the disturbance of vegetation on 16.5 acres and this disturbed area will be reseeded/planted with appropriate vegetation. During construction it is expected that the turbidity of the streamwater will be increased and until the channel stabilizes after construction, the existing sandy silt bottom will become predominantly a silt bottom. Average annual damages in the Willowbrook area will be reduced by $6,250. It is felt this channel would not reduce the existing damages occuring in the Montgomery and Aurora area.

The benefit/cost ratio for this element is 0.15:1.

Reservoir 53

Components: The excavation of 1,647,000 cubic yards primarily in the existing 100-year floodplain of Lake Run upstream of I-88 (East-West Tollway). This excavation would be just north of the existing power line in Section 1. The bypass structure would carry 180 cfs before any water entered the excavated pond. The inlet into the excavated area would be a 135 ft wide drop spillway. The bottom of the excavated area would be at elevation 677.0 which is above the existing channel bottom so the reservoir can be emptied without pumps through a 68" x 43" RCP. In order to store the 2% chance storm approximately 30,000 cubic yards of earthfill (maximum height of 6 feet) will be placed around the west and south sides of the storage area. An emergency spillway 360 feet wide would be cut through an existing knoll to carry the excess floodwater during a flood event greater than the 2% chance.

Costs: The total cost of this measure is $6,631,000 with average annual costs estimated to be $580,100 which includes $8,100 OM&R.

Effects: This reservoir, controlling a drainage area of 12.5 square miles, will increase the total volume of water stored upstream of I-88 by 660 acre-feet. The 1% chance peak flow at Galena Road will be reduced from 4360 to 3700 and at Willowbrook the 1% chance peak would be reduced from 3330 to 3250 cfs. A total of 185 acres will be disturbed during construction with 145 acres being excavation and fill areas, and 40 acres being used for spoil disposal. The bottom of this reservoir, covering approximately 100 acres will have very poor drainage and could become a shallow marsh with excavated ponds in the bottom of the planned flat bottom at 677.0. It is estimated that the number of buildings subject to 1% damage will be reduced from 90 to 68 and average annual benefits will equal $20,000.

The benefit/cost ratio for this element is less than .03:1.

Aurora Channel and Bridge Modifications

Components: The modification of 10,600 feet of the Blackberry Creek Channel from sta 70300 upstream of Jerico Road to sta 80900 which is about 2000 feet upstream of Galena Road. Work would consist of widening the existing channel to 80 feet bottom with new construction to be done from one side and all disturbed areas reseeded with appropriate vegetation. Any high points in the existing channel between sta 70300 and 80900 would be removed and existing bridge openings cleaned out. The existing bridge at the lane south of the Prairie Path would be replaced with four each 4' by 20' box culverts and a new bridge deck would be constructed at the Prairie Path. Total excavation will require the removal of 126,000 cubic yards of material.

Costs: The total cost of this measure is $738,500 with average annual costs estimated to be $66,000 which includes $2,300 for OM&R.

Effects: This channel modification will result in less water flowing over Galena Road and thus reduce average annual damages in Cherry Hills significantly. However, by improving the efficiency of the channel and keeping water away from the existing storage area upstream of the BNRR the peak flows past Montgomery and Willowbrook increase and damages to these two communities would increase. This measure by itself was not considered to be acceptable and benefits were never calculated.

Reservoir 53 plus the Aurora Channel and Bridge Modification

Components: The construction of both Reservoir 53 and Aurora Channel with bridge modifications would entail the excavation of 1,773,000 cubic yards of earth material. The components included were previously described.

Costs: The total cost of this combination is $7,369,500 with average annual costs estimated to be $646,100 which includes $10,400 for OM&R.

Effects: The installation of both these measures provides significant damage reduction at Cherry Hills and also reduces damages in both Montgomery and Willowbrook. The channel modification will disturb about 35 acres of existing vegetation. This disturbed area will be re-vegetated. During construction it is expected that the turbidity of the stream will be increased. Also during construction and until the channel stabilizes after construction, the existing sandy/silt bottom will be primarily a silt bottom. Total area disturbed by the two measures is 220 acres. Average annual damages would be reduced by $34,200 and 45 buildings would be protected from the 1% chance flood.

The benefit/cost ratio for this element is .05:1.

GLOSSARY AND REFERENCES

Glossary

Avg. Annual Damage- The estimated average yearly damage expected to occur during the project evaluation period.

Elevation- The variation in the height of the earth's surface; the measure of the vertical distance from a known datum plane, which on most maps is mean sea level.

Fill- Material such as earth, clay, or crushed stone which is dumped in an area and compacted to increase ground elevation.

Flood- An overflow of water onto land not normally covered by water. This inundation of land is temporary, and the land is normally adjacent to a river or stream, lake, or other body of standing water.

Flood Crest- The maximum stage or elevation reached by the waters of flood at a given location. It may be referred to as flood elevation.

Flood Damage- Flood damages are significant adverse effects caused by any flood or temporary rise of stream flow or stage. The adverse effects include such things as accumulation of debris, damage to property, erosion, sedimentation, sewer backup, traffic disruption, or other problems.

Flood Fringe- Portion of the floodplain that lies beyond the floodway and serves as a temporary storage area for floodwaters during a flood. Receives waters that are shallow and low velocity flow.

Flood Peak- (Peak Discharge) The maximum instantaneous discharge at a given location. It usually occurs at or near the time of the flood crest.

Flood Stage- The stage or elevation at which overflow of the natural banks of a stream or body of water begins to cause damage in the reach or area in which the elevation is measured.

Floodplain- Normally dry lands adjoining the stream channel, or other body of water, that is susceptible to flood inundation.

Floodplain Encroachment- Obstruction in part of a floodplain which reduces floodwater carrying capacity, therefore increasing flood stages.

Head Loss- The effect of natural or man-made obstructions such as small bridge openings, buildings, fill, or accumulation of debris which limits the conveyance of water, causing a rise in upstream water surface elevation.

100 Year Flood- A flood having a 1% chance of being equaled or exceeded in any one year. It may occur in any year. It is based on a statistical analysis of precipitation and gage records. Also referred to as a flood with a 100 year recurrence interval.

Valley Cross Section- The relationship of the elevation of the ground to the horizontal distance across a valley perpendicular to the direction of flow.

Water Surface Profile- A graph (elevation view) showing the relationship of water surface elevation and natural ground elevations at a given location along a watercourse for a specific discharge. It is referred to as a flood profile when drawn for a specific flood.

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SOIL CONSERVATION SERVICE

URBAN DEVELOPMENT

1987

BY 2005

LEGEND

- WATERSHED BOUNDARY
- FOREST PRESERVE
- COUNTY LINE
- G.L.O. TOWNSHIP LINE
- SECTION LINE
- CITY LIMITS
- TOWN
- FEDERAL HIGHWAY
- STATE HIGHWAY
- COUNTY HIGHWAY
- DIVIDED ROAD
- PRIMARY ROAD
- SECONDARY ROAD
- RAILROAD
- DRAINAGE
- LAKE
- INTERMITTENT LAKE
- SWAMP OR MARSH
- POWER-TRANSMISSION LINE
- CEMETERY

VICINITY MAP

BLACKBERRY CREEK WATERSHED

KANE AND KENDALL COUNTIES

ILLINOIS

MILES

FIGURE 5

2000 1986 BASE 4 N 32435

U.S. DEPARTMENT DF AGRICULTURE

SDIL CONSERVATIDN SERVICE

VICINITY MAP

WATERSHED MAP

BLACKBERRY CREEK WATERSHED

KANE AND KENDALL COUNTIES

ILLINOIS

0 1 2 MILES

0 1 2 KILOMETERS

SOURCE
BASE COMPILED FROM USGS 1:24,000 QUADRANGLE SHEETS AND LATEST COUNTY HIGHWAY MAP
POLYCONIC PROJECTION

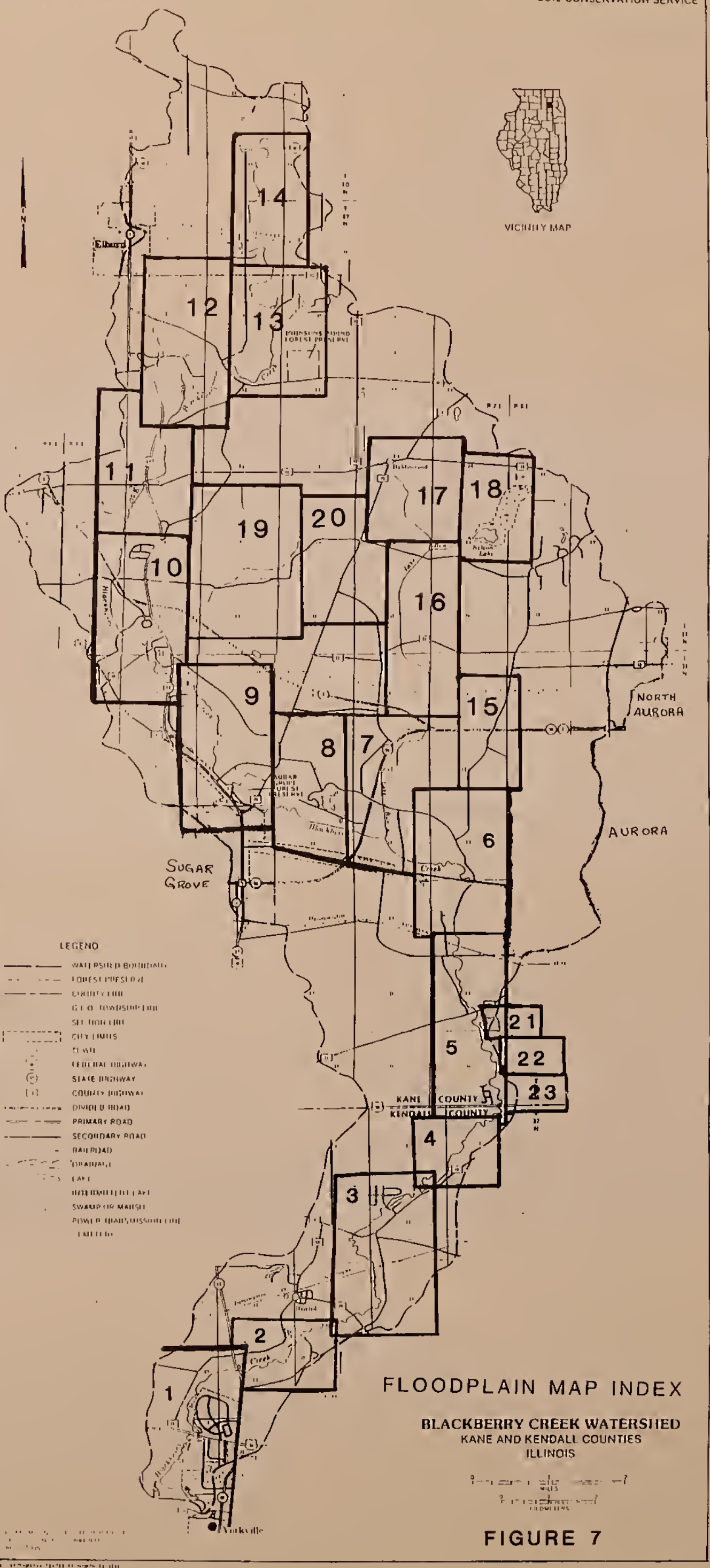
FIGURE 6

USDA SCS NATIONAL CARTOGRAPHIC CENTER, FT WORTH, TX.-1986

JUNE 1986 BASE 4 R 39435

U S DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE



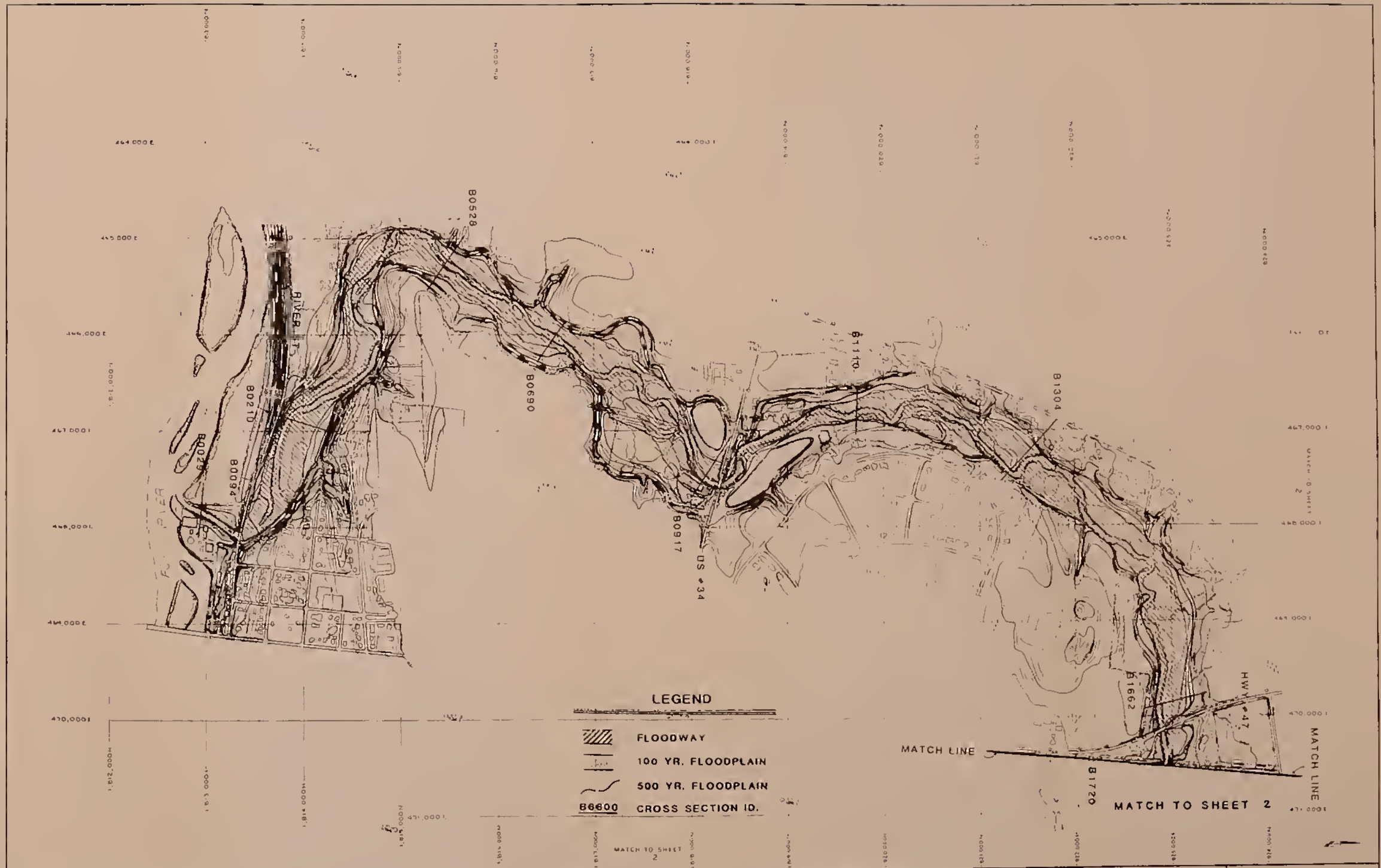
FLOODPLAIN MAP INDEX

BLACKBERRY CREEK WATERSHED

KANE AND KENDALL COUNTIES

ILLINOIS

FIGURE 7



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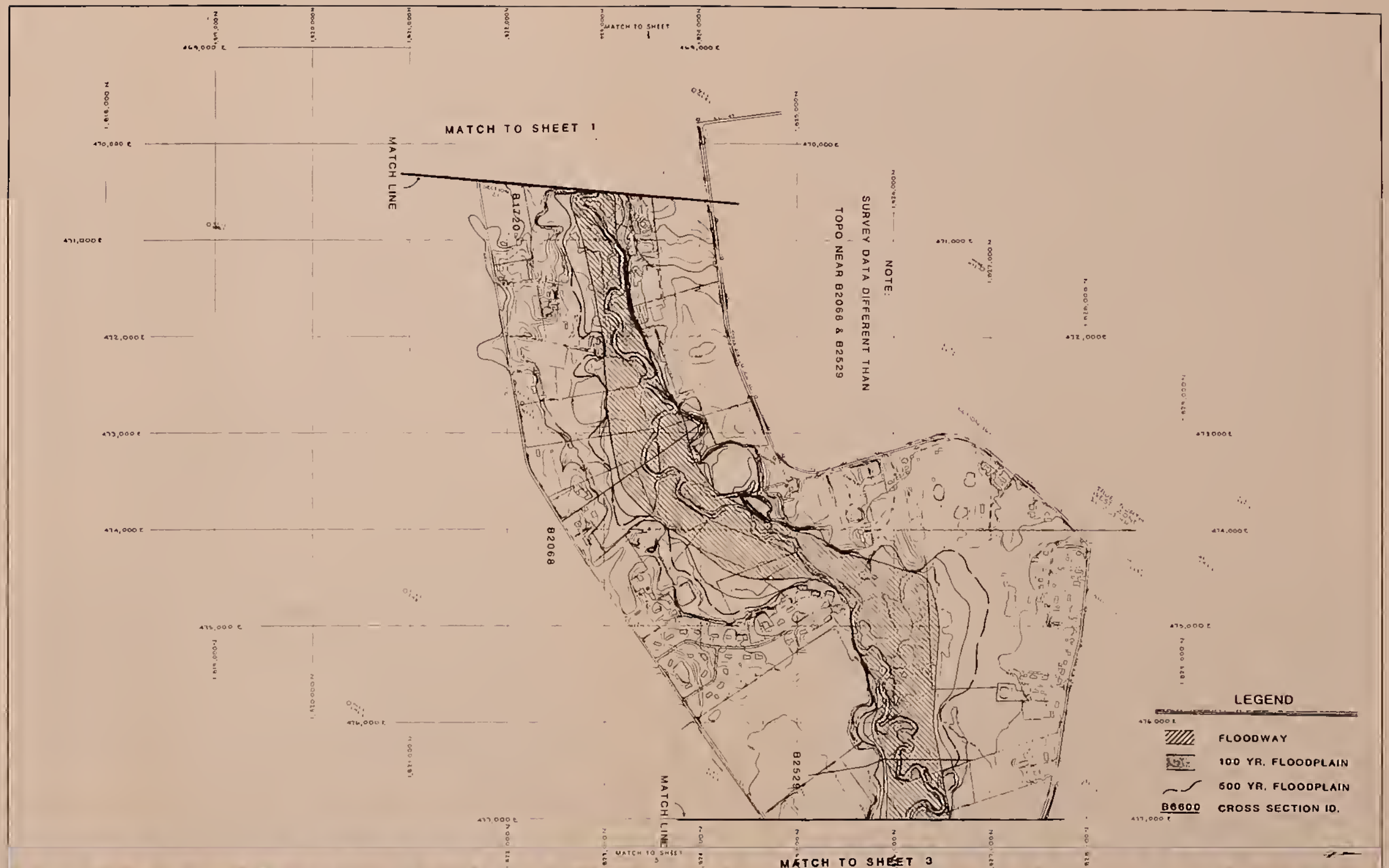

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DIVISION OF WATER RESOURCES

FLOODPLAIN TOPOGRAPHIC MAP
BLACKBERRY CREEK
KENDALL AND KANE COUNTIES, ILLINOIS

CONTOUR INTERVAL

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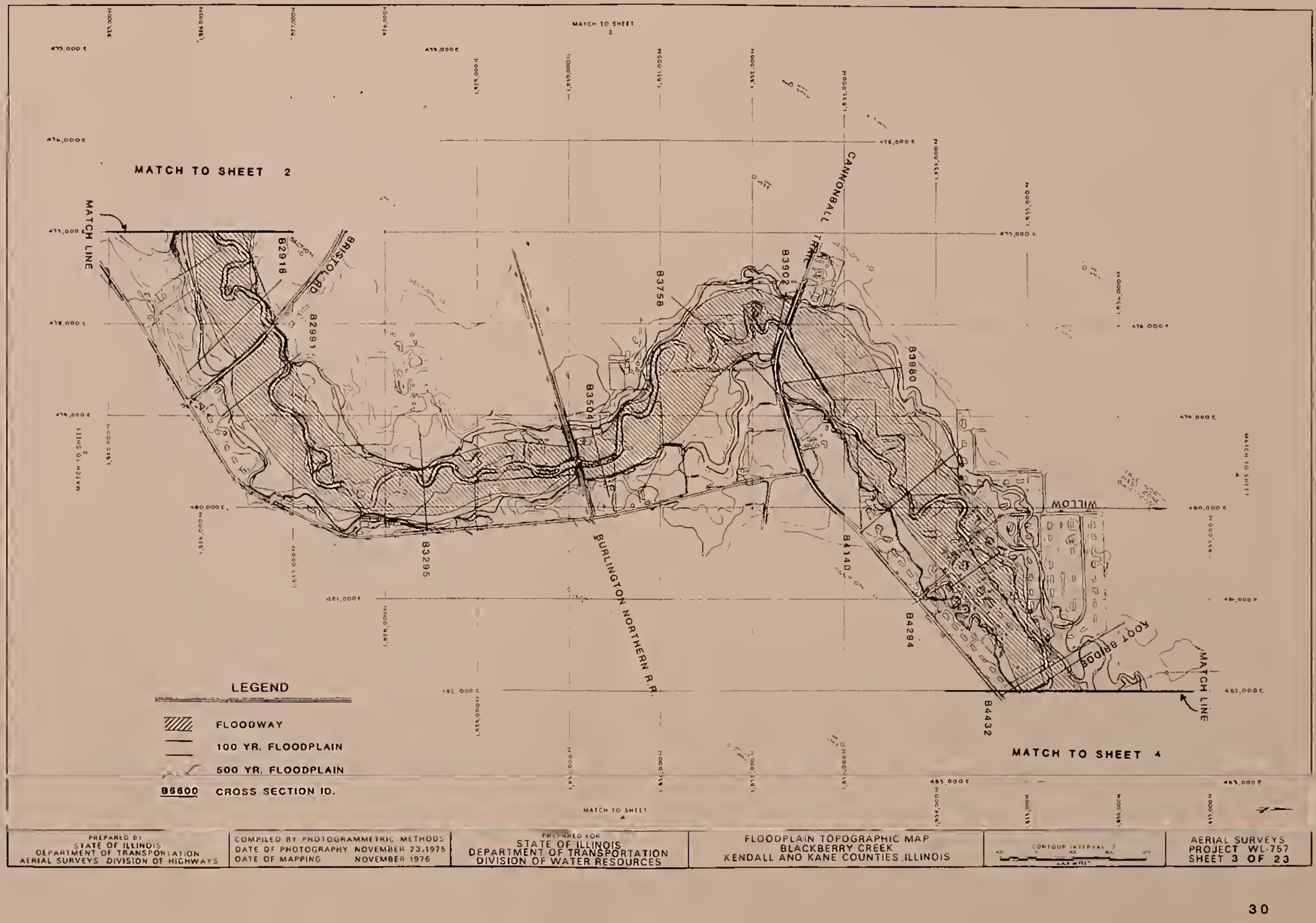

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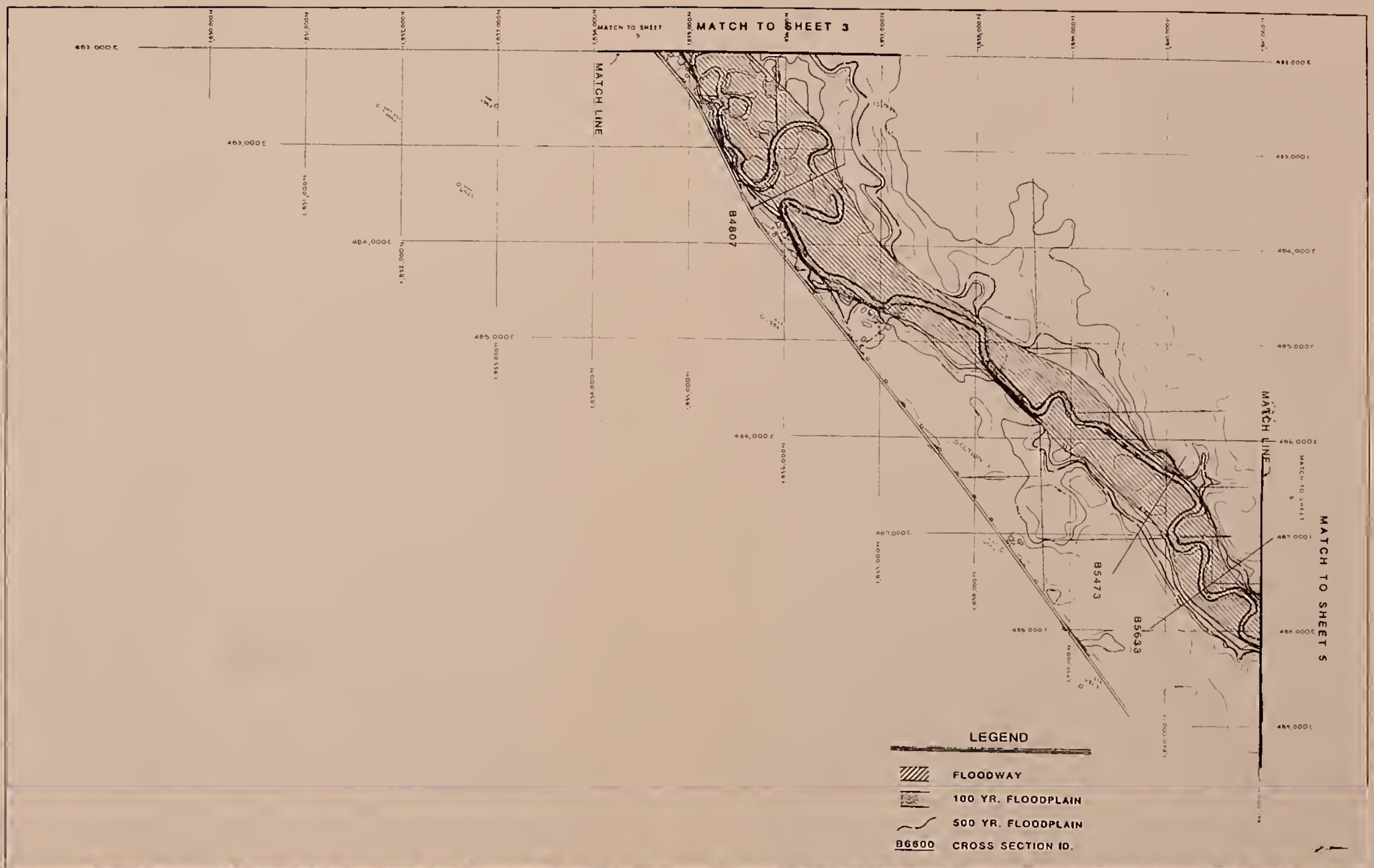

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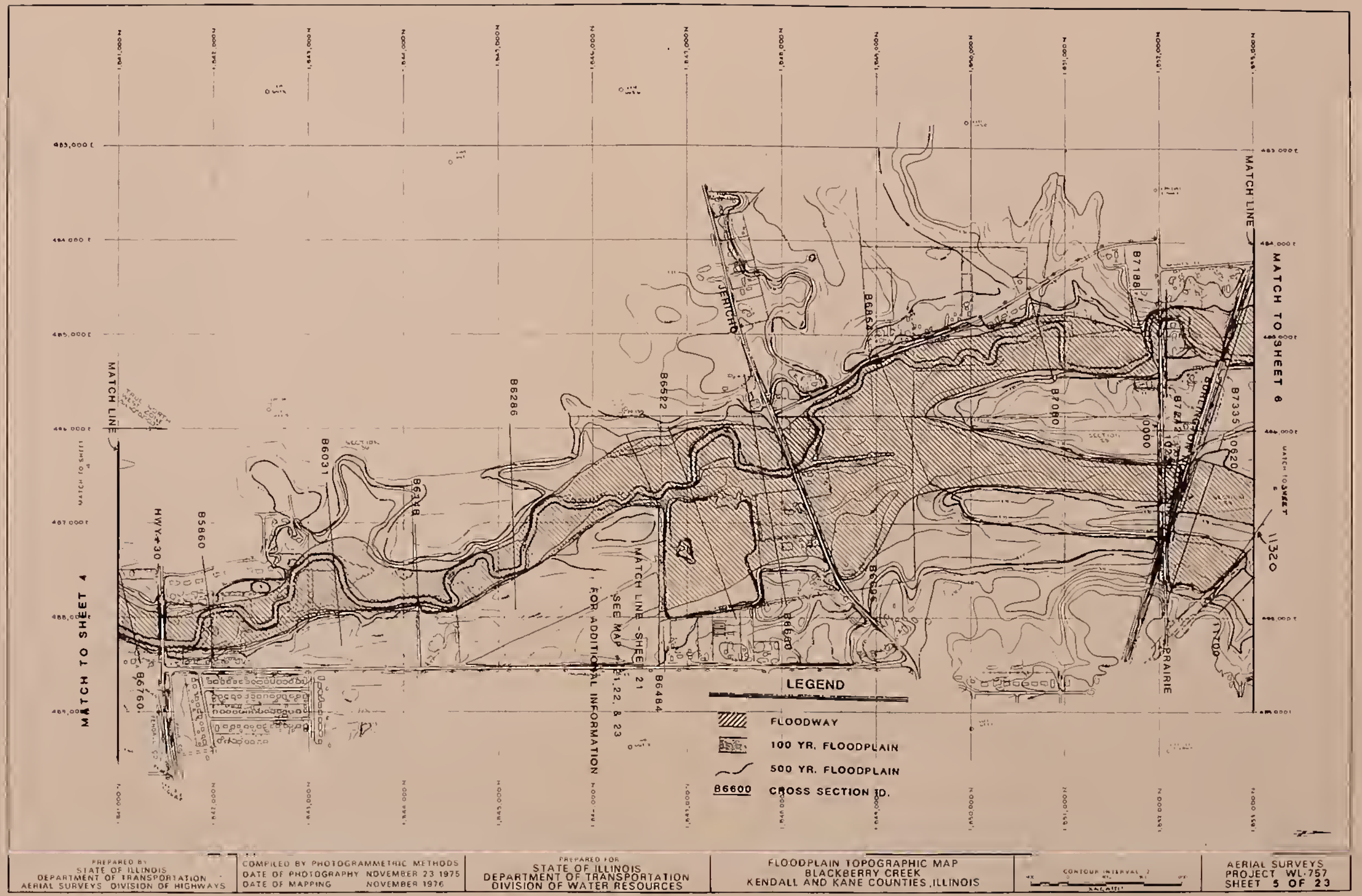

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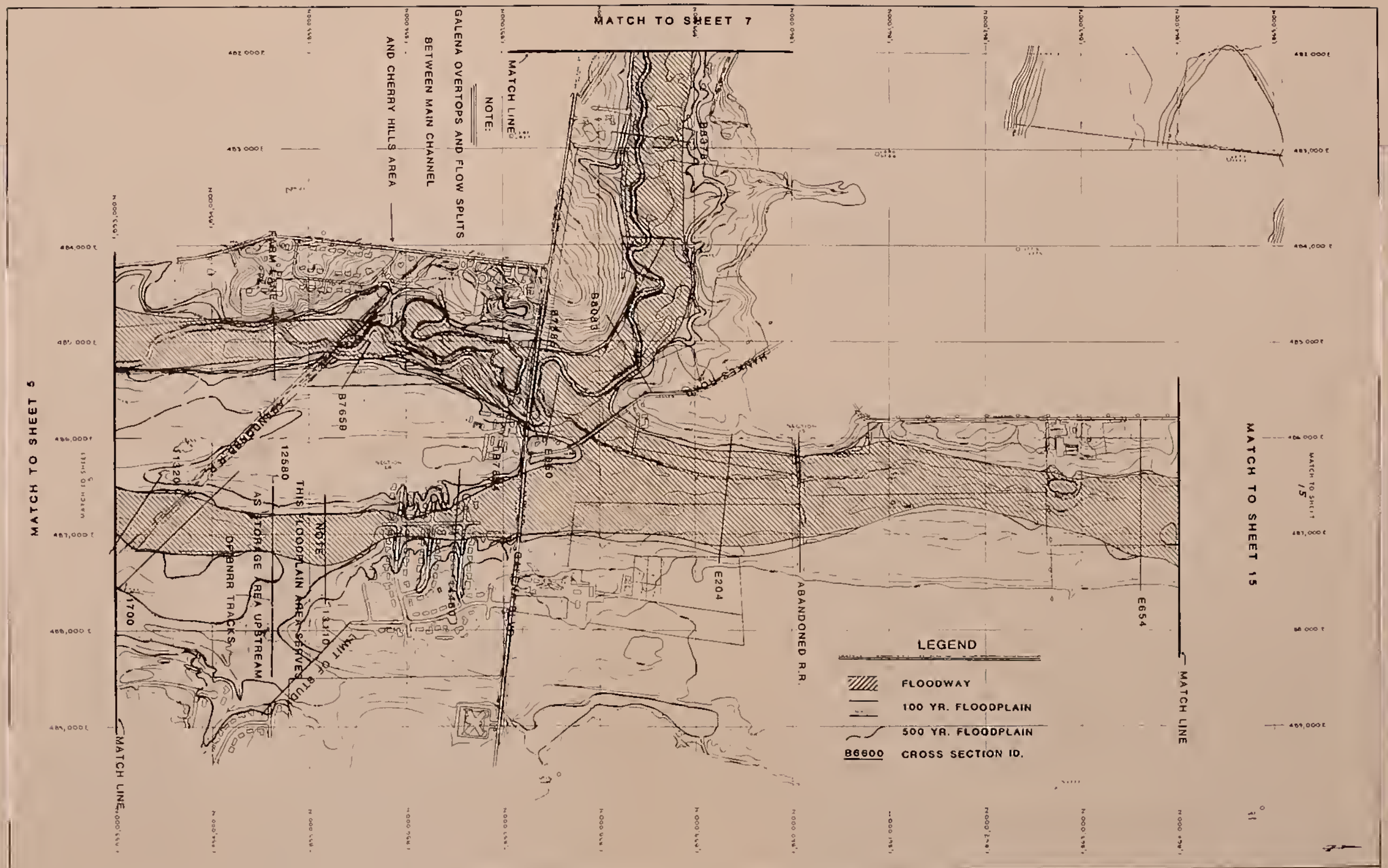

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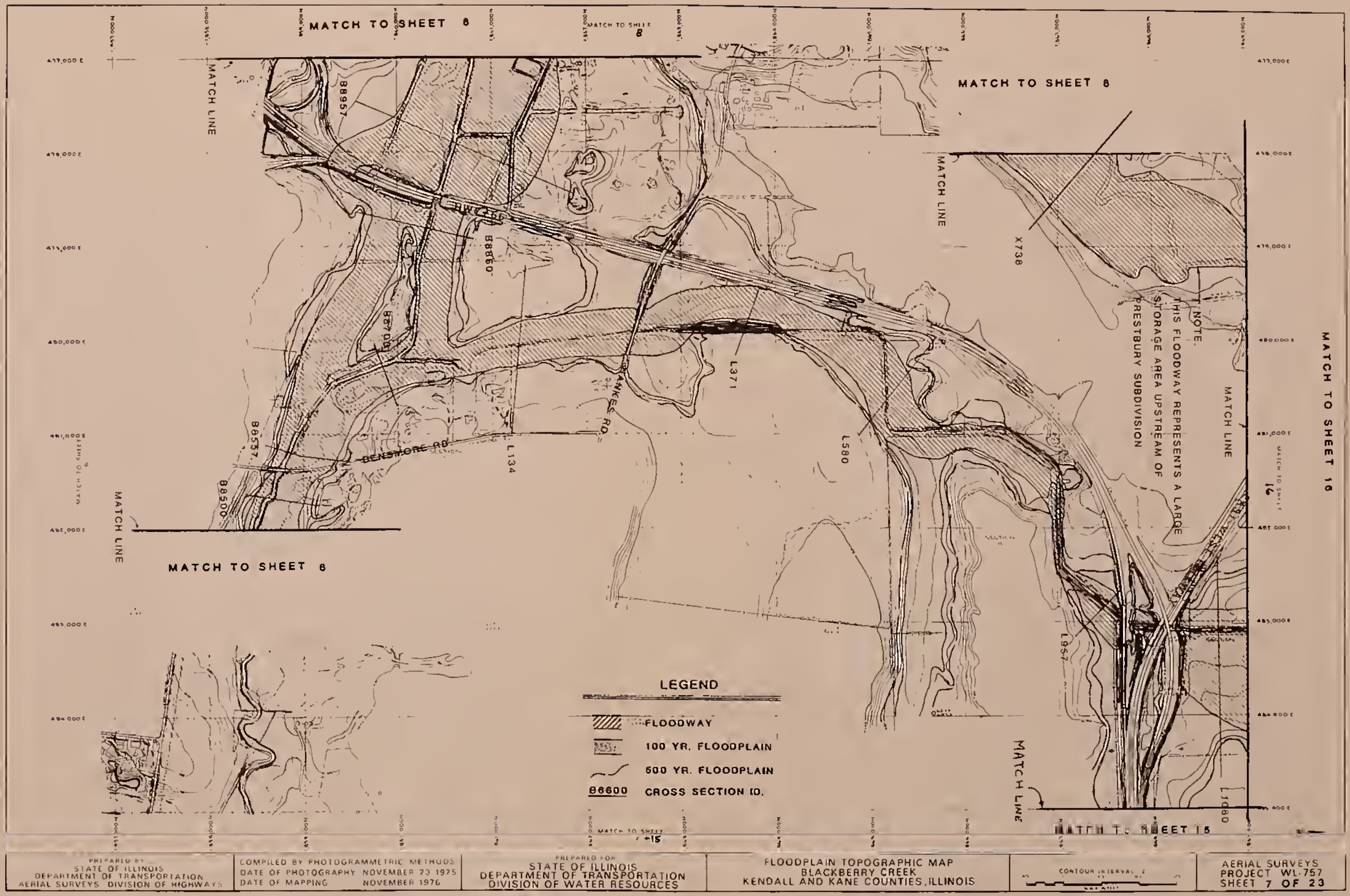

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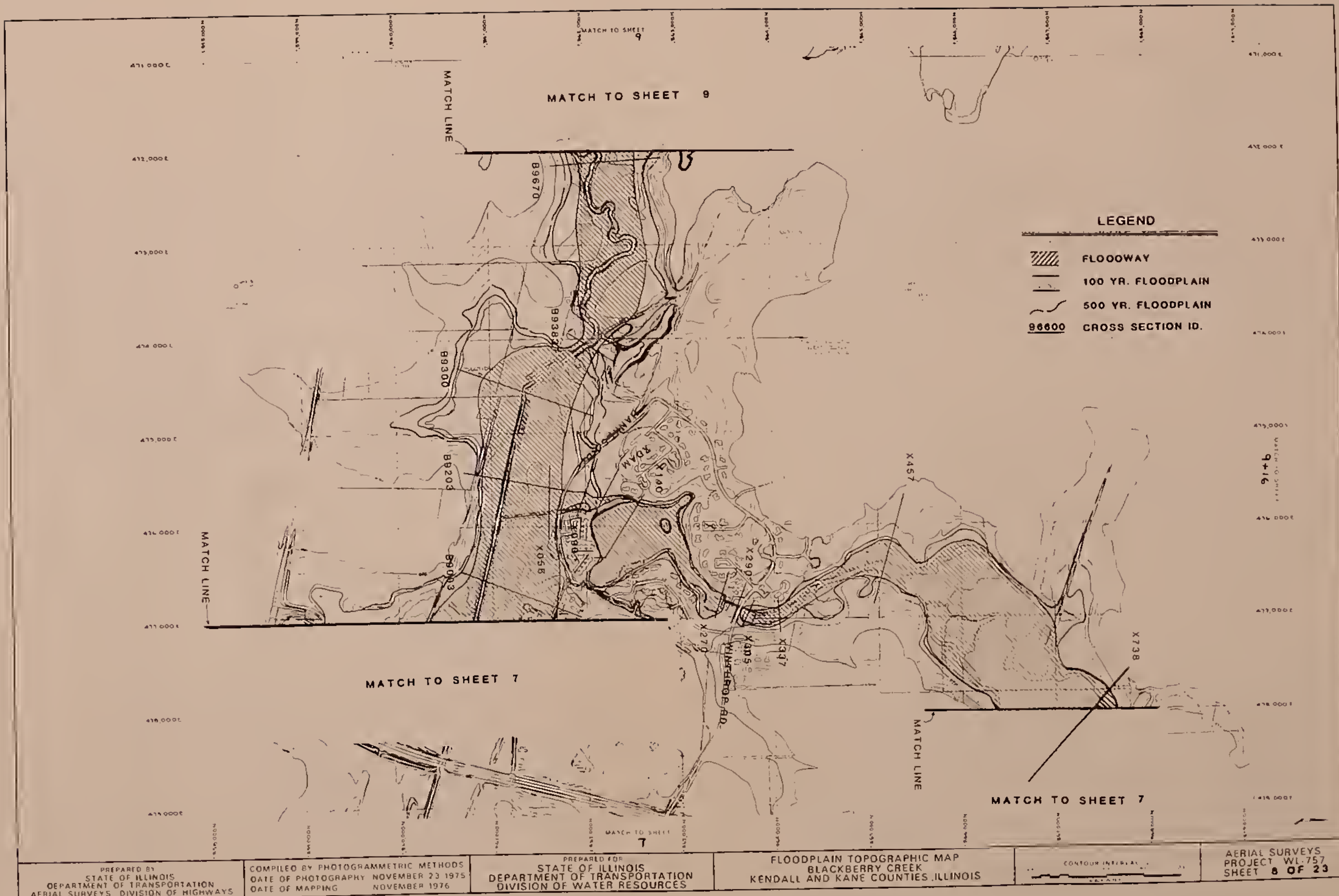
MATCH TO SHEET 9
MATCH LINE
LEGEND
FLOODWAY
100 YR. FLOODPLAIN
500 YR. FLOODPLAIN
96600 CROSS SECTION ID.
89670
89382
89300
89203
89003
X058
X090
X140
X290
X270
X305
X337
X457
X738
DAM
WINTHROP RD.
MATCH TO SHEET 7
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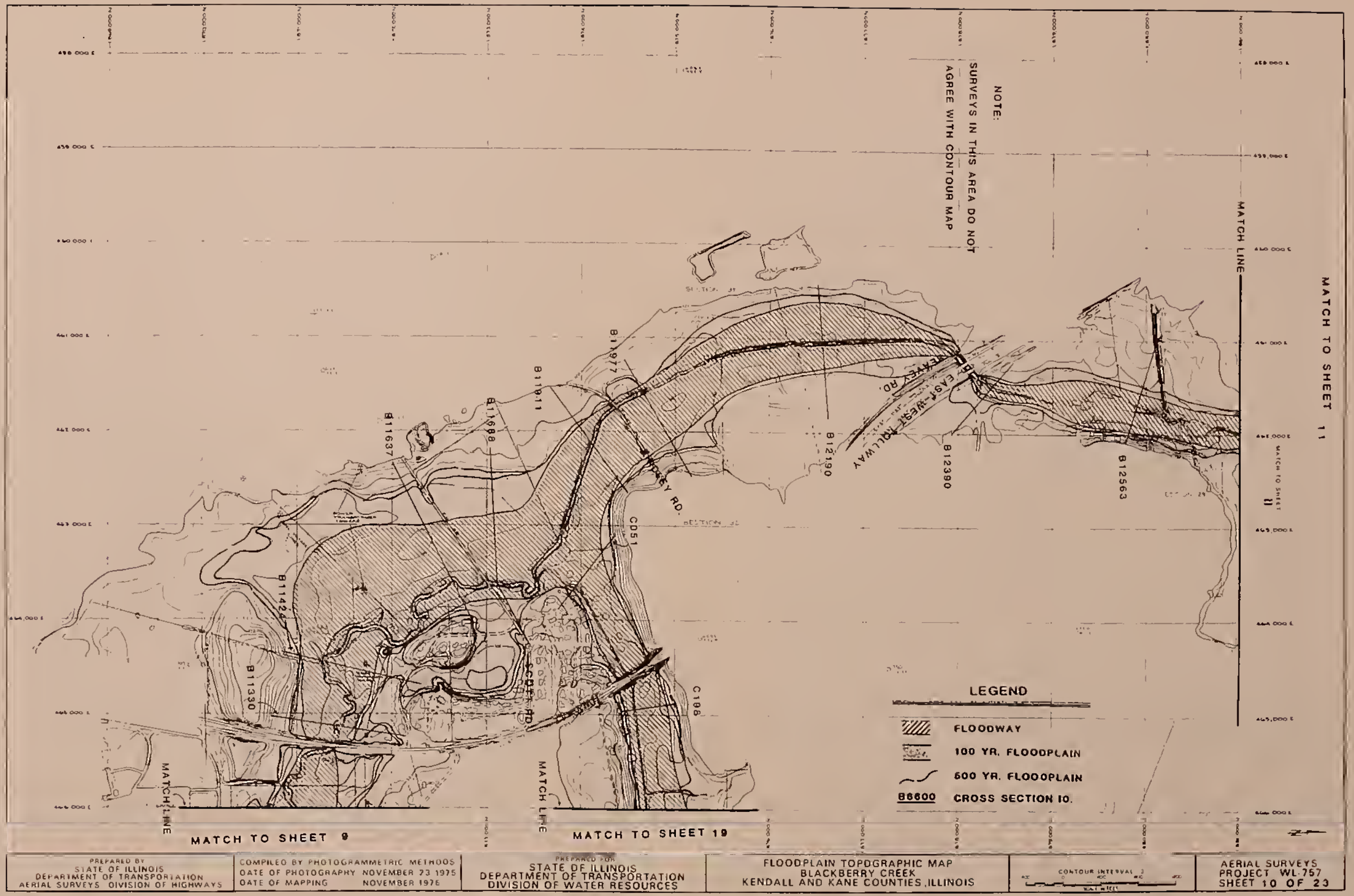

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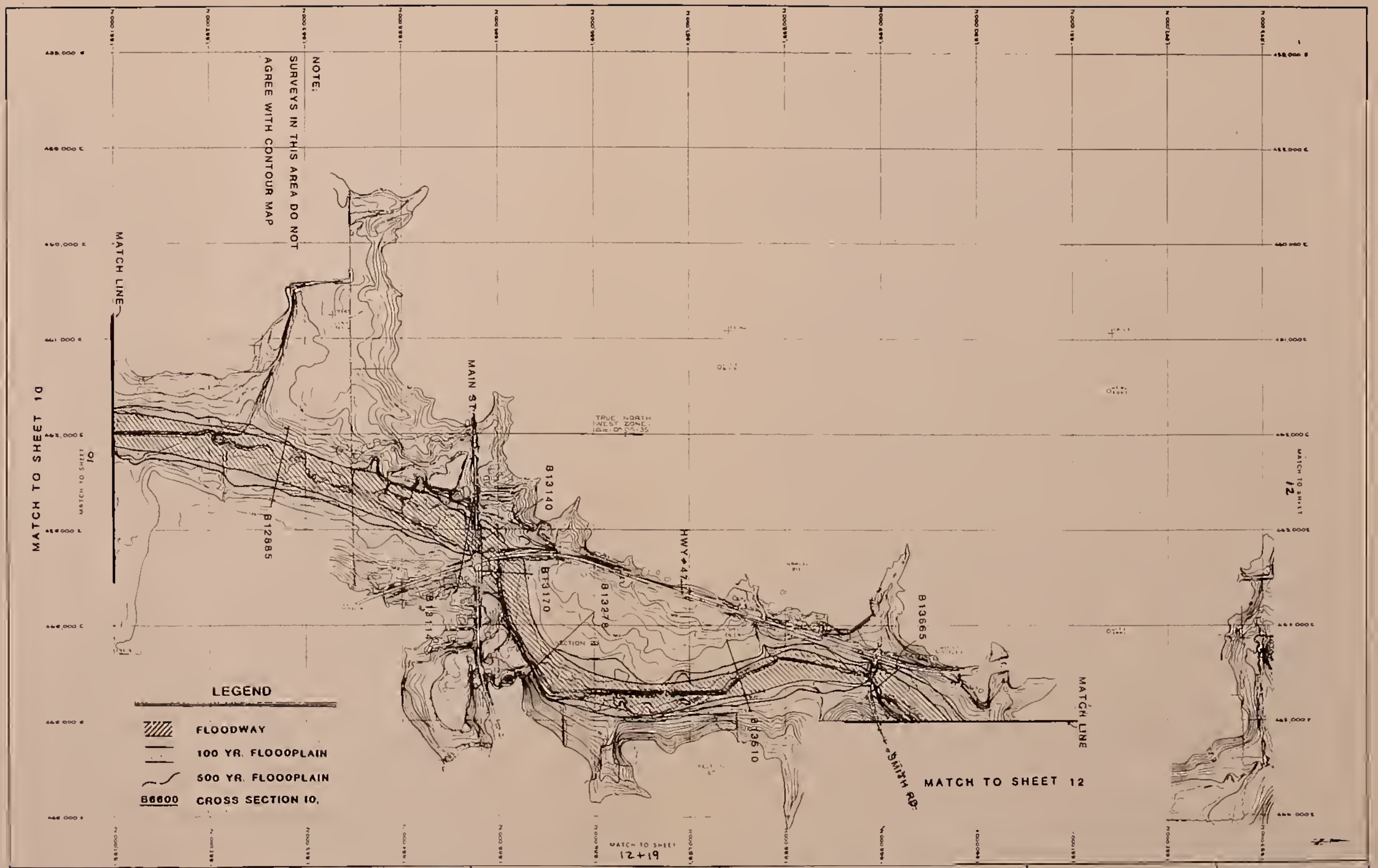

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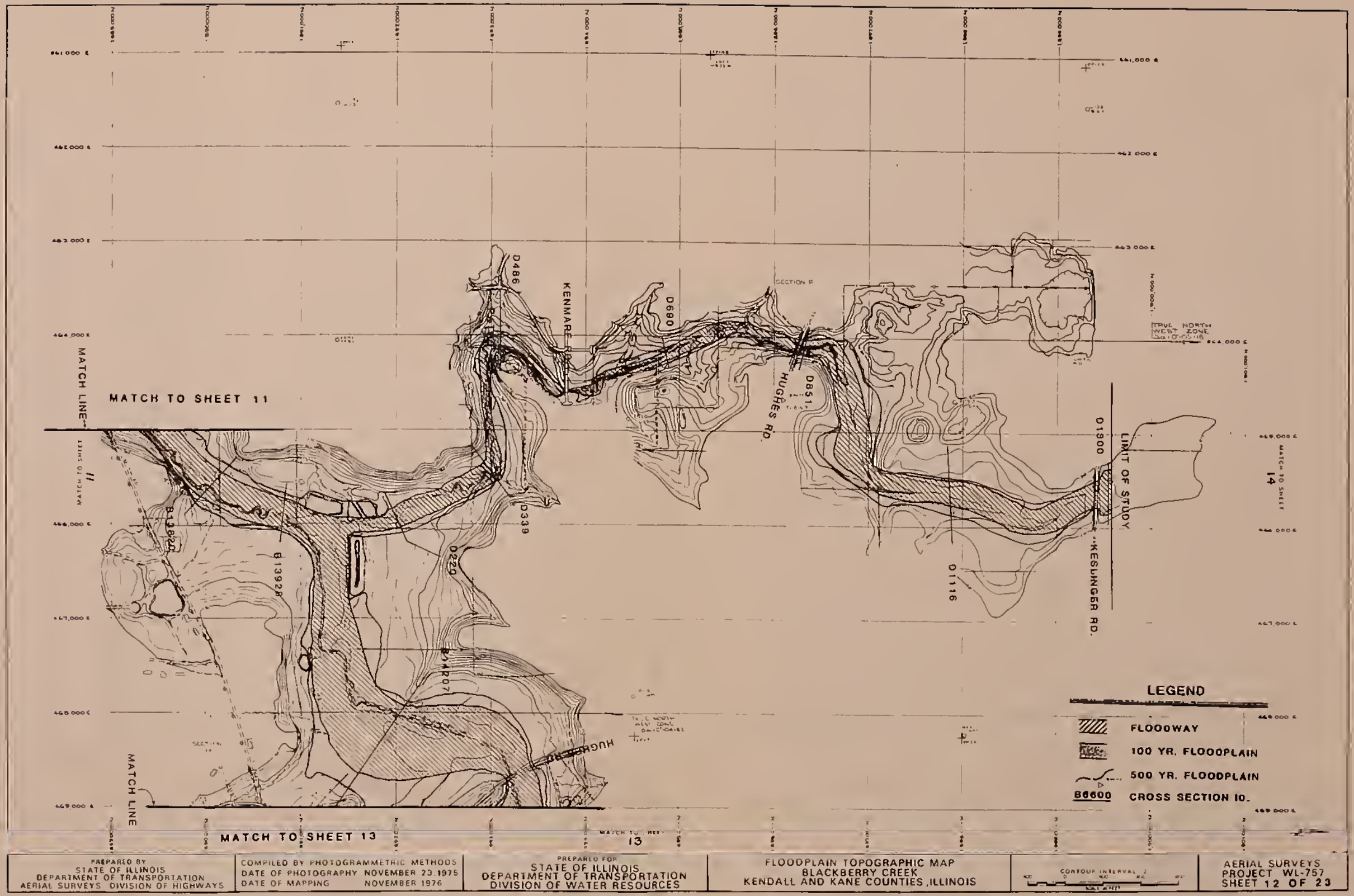

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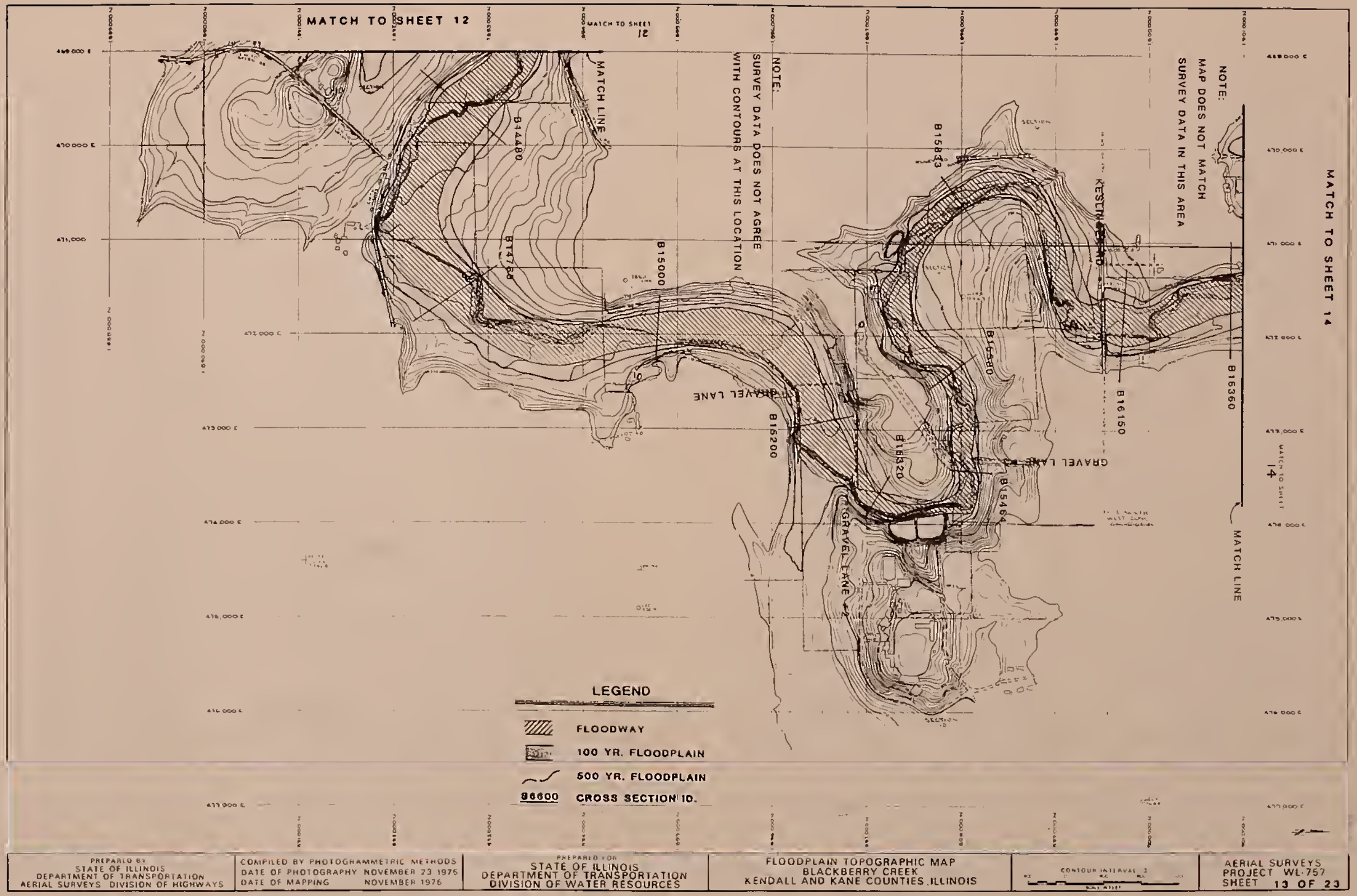

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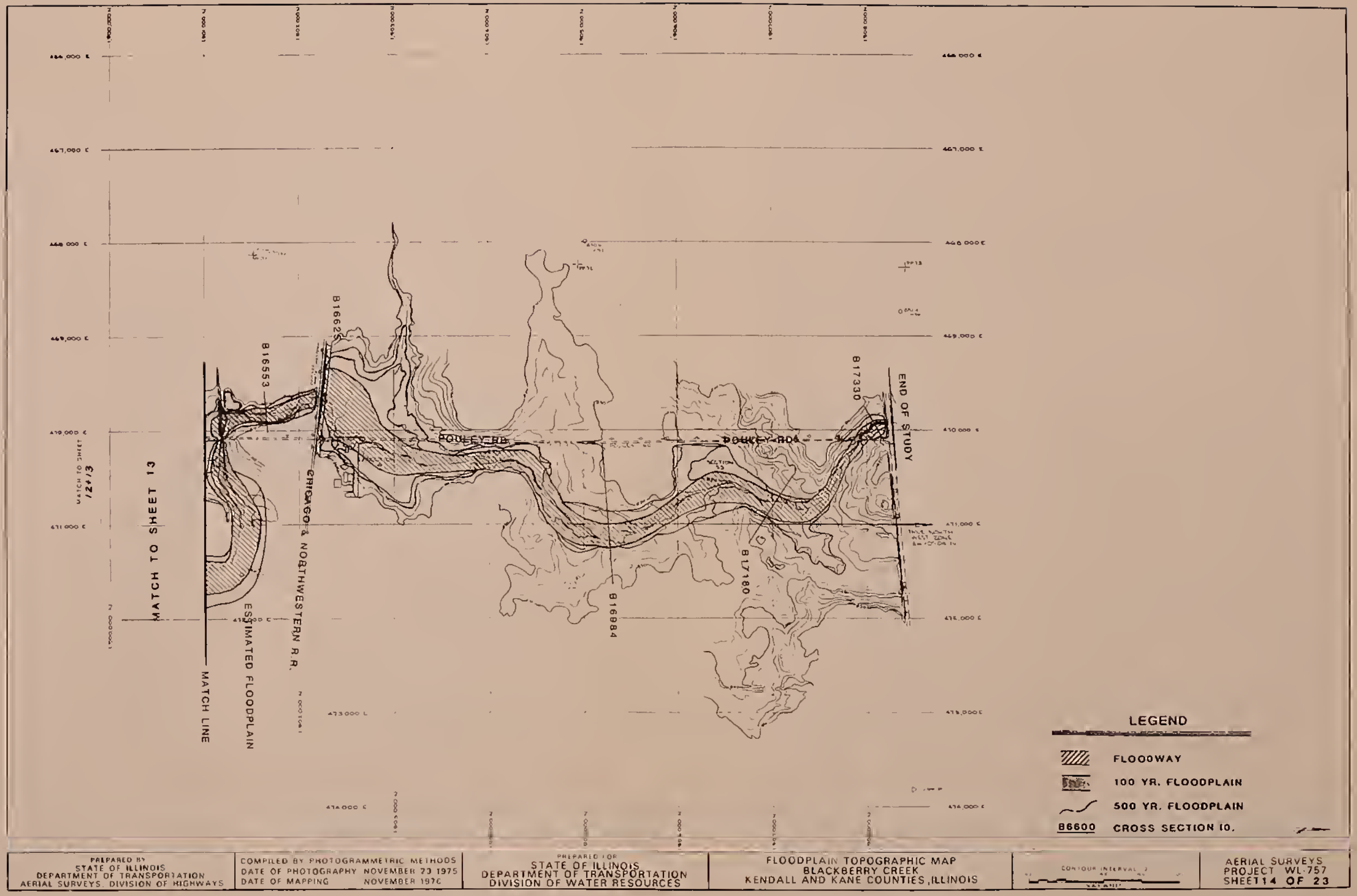

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MATCH TO SHEET 7 & 16

MATCH TO SHEET 7+16

MATCH TO SHEET 6

MATCH LINE

MATCH LINE

INDIAN TRAIL RD.

E 1000

SECTION 1

TRUE NORTH
WEST ZONE

LEGEND

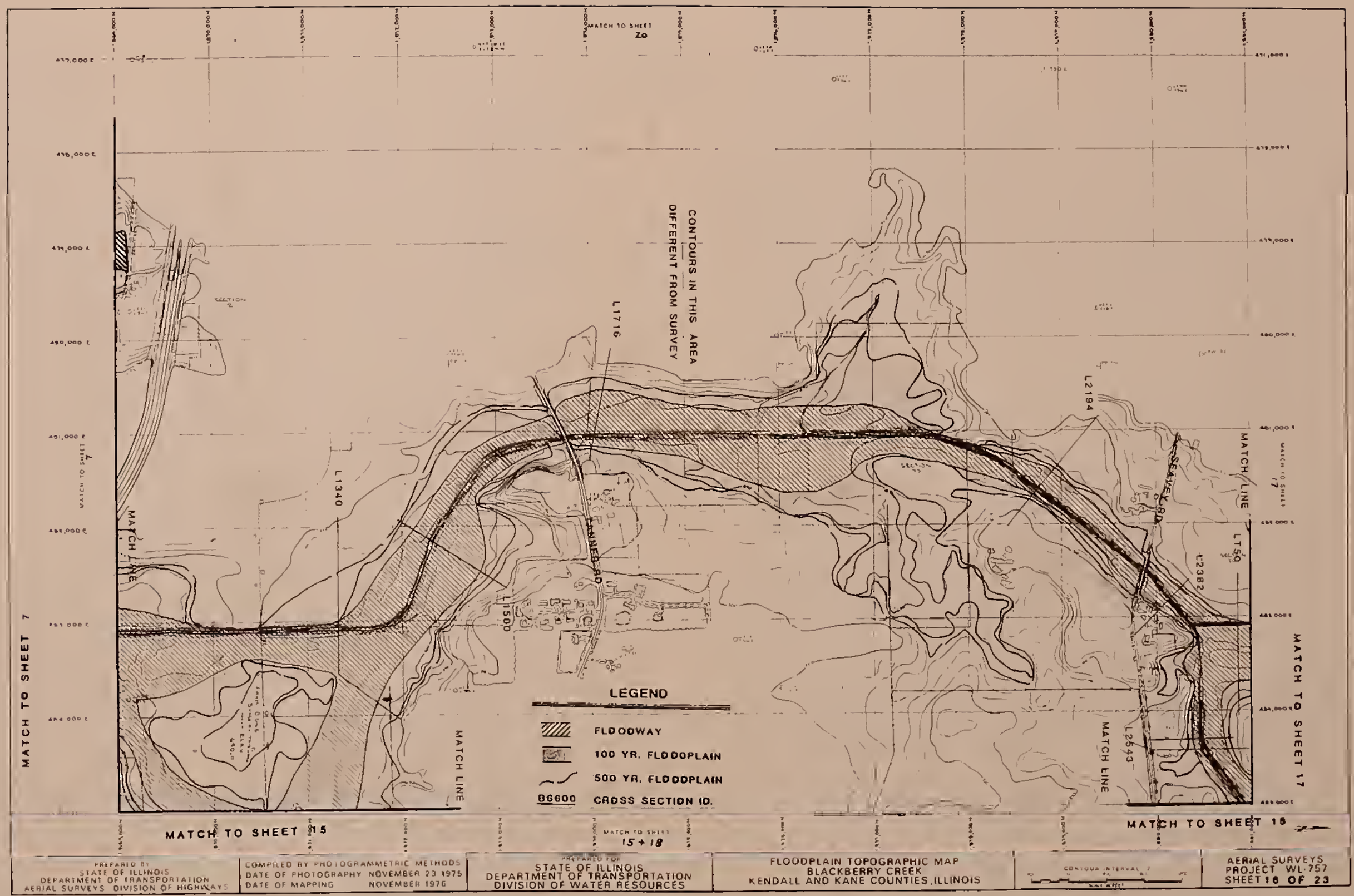
FLOODWAY

100 YR. FLOODPLAIN

500 YR. FLOODPLAIN

B6600 CROSS SECTION ID.

PREPARED BY STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION AERIAL SURVEYS DIVISION OF HIGHWAYS	COMPILED BY PHOTOGRAMMETHIC METHODS DATE OF PHOTOGRAPHY NOVEMBER 23 1975 DATE OF MAPPING NOVEMBER 1976	PREPARED FOR STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION DIVISION OF WATER RESOURCES	FLOODPLAIN TOPOGRAPHIC MAP BLACKBERRY CREEK KENDALL AND KANE COUNTIES, ILLINOIS	CONTOUR INTERVAL 2	AERIAL SURVEYS PROJECT WL-757 SHEET 15 OF 23



PREPARED BY
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
AERIAL SURVEYS DIVISION OF HIGHWAYS

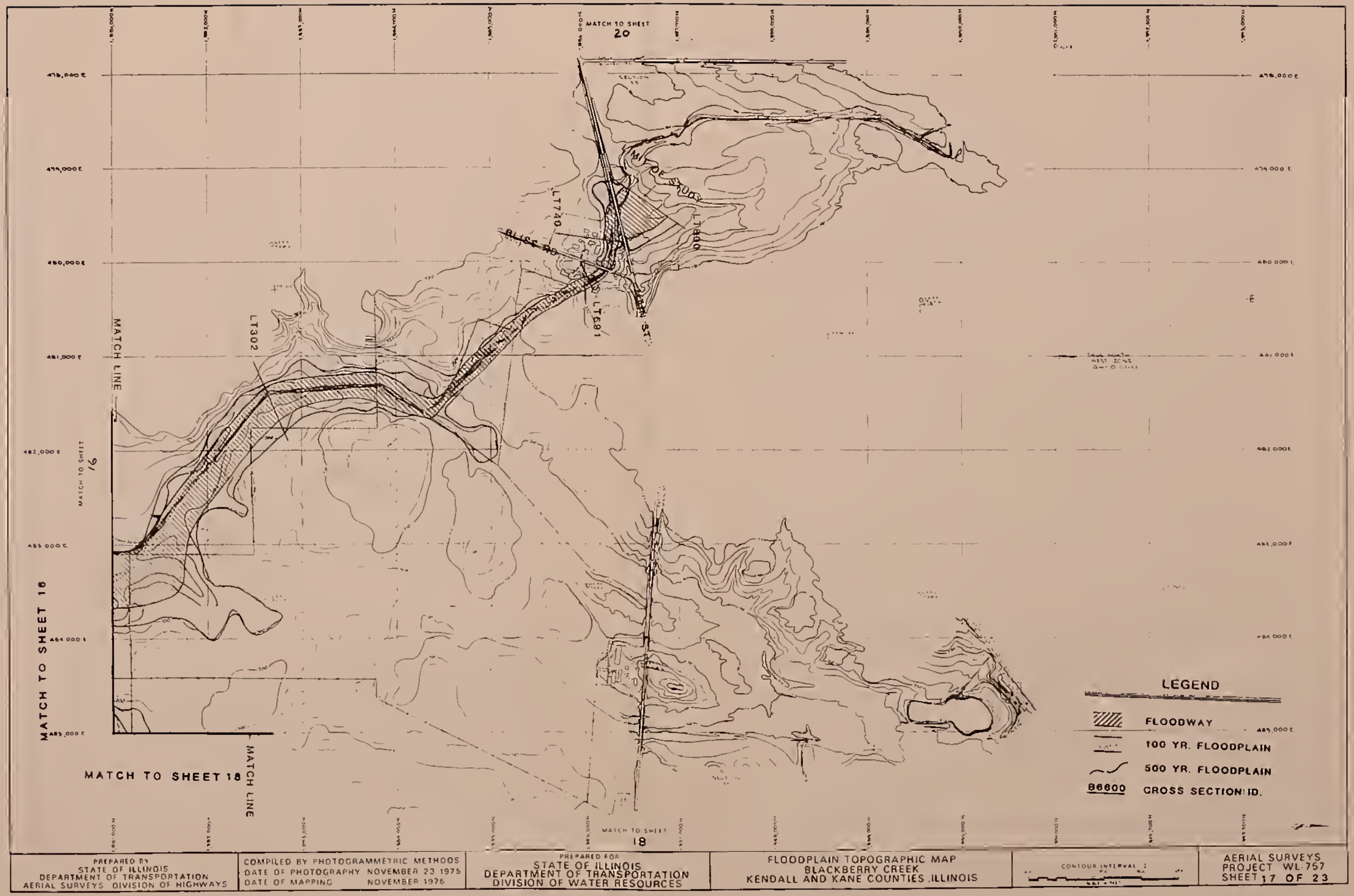
COMPILED BY PHOTOGRAMMETRIC METHODS
DATE OF PHOTOGRAPHY NOVEMBER 23 1975
DATE OF MAPPING NOVEMBER 1976

PREPARED FOR
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF WATER RESOURCES

FLOODPLAIN TOPOGRAPHIC MAP
BLACKBERRY CREEK
KENDALL AND KANE COUNTIES, ILLINOIS

CONTOUR INTERVAL 2'

AERIAL SURVEYS
PROJECT WL-757
SHEET 16 OF 23



PREPARED BY STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION AERIAL SURVEYS DIVISION OF HIGHWAYS	COMPILED BY PHOTOGRAMMETRIC METHODS DATE OF PHOTOGRAPHY NOVEMBER 23 1975 DATE OF MAPPING NOVEMBER 1976	PREPARED FOR STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION DIVISION OF WATER RESOURCES	FLOODPLAIN TOPOGRAPHIC MAP BLACKBERRY CREEK KENDALL AND KANE COUNTIES ILLINOIS	CONTOUR INTERVAL	AERIAL SURVEYS PROJECT WL-757 SHEET 17 OF 23

MATCH TO SHEET 16 & 17

MATCH LINE

L2880 END OF PLOTTED PROFILE

TRUE NORTH
WEST ZONE
10° 01' 54"

MATCH TO SHEET 15

MATCH TO SHEET 17

LEGEND

- FLOOOWAY
- 100 YR. FLOOOPLAIN
- 500 YR. FLOOOPLAIN
- B6600 CROSS SECTION 10.

PREPARED BY STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION AERIAL SURVEYS. DIVISION OF HIGHWAYS	COMPILED BY PHOTOGRAMMETRIC METHODS DATE OF PHOTOGRAPHY NOVEMBER 23 1975 DATE OF MAPPING NOVEMBER 1976	PREPARED FOR STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION DIVISION OF WATER RESOURCES	FLOOOPLAIN TOPOGRAPHIC MAP BLACKBERRY CREEK KENDALL AND KANE COUNTIES, ILLINOIS	CONTOUR INTERVAL 2	AERIAL SURVEYS PROJECT WL-767 SHEET 18 OF 23

MATCH TO SHEET 10

MATCH TO SHEET 10 & 11

MATCH LINE

C513

SEAVEY RD.

C846

C1583

FARM LANE

C1584

END OF STUDY

MATCH LINE

MATCH TO SHEET 20

MATCH TO SHEET 20

LEGEND

- FLOODWAY
- 100 YR. FLOODPLAIN
- 500 YR. FLOODPLAIN
- B6600 CROSS SECTION ID.

PREPARED BY STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION AERIAL SURVEYS, DIVISION OF HIGHWAYS	COMPILED BY PHOTOGRAMMETRIC METHODS DATE OF PHOTOGRAPHY NOVEMBER 23 1975 DATE OF MAPPING NOVEMBER 1976	PREPARED FOR STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION DIVISION OF WATER RESOURCES	FLOODPLAIN TOPOGRAPHIC MAP BLACKBERRY CREEK KENDALL AND KANE COUNTIES, ILLINOIS	CONTOUR INTERVAL 2	AERIAL SURVEYS PROJECT WL-767 SHEET 19 OF 23

MATCH TO SHEET 19

MATCH TO SHEET 19

MATCH LINE

LEGEND

- FLOODWAY
- 100 YR. FLOODPLAIN
- 500 YR. FLOODPLAIN
- B6600 CROSS SECTION ID.

NOTE:
FLOODPLAIN ALONG LAKE RUN & TRIB. SHOWN ON SHEET 10 & 11

MATCH TO SHEET 16

MATCH TO SHEET 17

MATCH TO SHEET 16+17

PREPARED BY STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION AERIAL SURVEYS DIVISION OF HIGHWAYS	COMPILED BY PHOTOGRAMMETRIC METHODS DATE OF PHOTOGRAPHY NOVEMBER 23 1975 DATE OF MAPPING NOVEMBER 1976	PREPARED FOR STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION DIVISION OF WATER RESOURCES	FLOODPLAIN TOPOGRAPHIC MAP BLACKBERRY CREEK KENDALL AND KANE COUNTIES, ILLINOIS	CONTOUR INTERVAL 2	AERIAL SURVEYS PROJECT WL-757 SHEET 20 OF 23

B6652

B6484

MATCH LINE- SHEET 22

FF

LEGEND

ORTHOPHOTOGRAMMETRIC MAPPING

DATE OF PHOTOGRAPHY APRIL 1, 1987

DATE OF MAPPING DECEMBER 1987

CONTOUR INTERVAL

DATUM N.G.V.D. 1929

SCALE IN FEET

200 0 200 400 600 800 1000

PREPARED FOR

ILLINOIS DEPARTMENT OF TRANSPORTATION
DIVISION OF WATER RESOURCES

PREPARED BY
AERIAL SURVEYS
DIVISION OF HIGHWAYS

PROJECT NO
WL-1399

BLACKBERRY CREEK

KANE AND KENDALL COUNTIES

48

OVERFLOW INTO MONTGOMERY FROM BLACKBERRY CREEK SECTIONS AA - FF

SHEET 21 OF 23

ORTHOPHOTOGRAMMETRIC MAPPING

ILLINOIS DEPARTMENT OF TRANSPORTATION
DIVISION OF WATER RESOURCES

AERIAL SURVEYS
DIVISION OF HIGHWAYS

PROJECT NO
WL-1399

BLACKBERRY CREEK
KANE AND KENDALL COUNTIES

49

OVERFLOW INTO MONTGOMERY FROM BLACKBERRY CREEK
SECTIONS AA – FF

SHEET 22 OF 23

E 486.000 E 487.000 E 488.000 MATCH TO SHEET NO 2 E 489.000 E 490.000 E 491.000 E 492.000

N 1844 000 N 1843 000 N 1842 000 N 1841 000

E 486.000 E 487.000 E 488.000 E 489.000 E 490.000 E 491.000 E 492.000

LEGEND

ORTHOPHOTOGRAMMETRIC MAPPING

DATE OF PHOTOGRAPHY APRIL 20 1980 CONTOUR INTERVAL 1'

DATE OF MAPPING DECEMBER 1981 DATUM U.S.C.&G.S. 1929 ADJ.

SCALE IN FEET 200 0 200 400 600 800 1000

PREPARED FOR
ILLINOIS DEPARTMENT OF TRANSPORTATION
DIVISION OF WATER RESOURCES

PREPARED BY
AERIAL SURVEYS
DIVISION OF HIGHWAYS

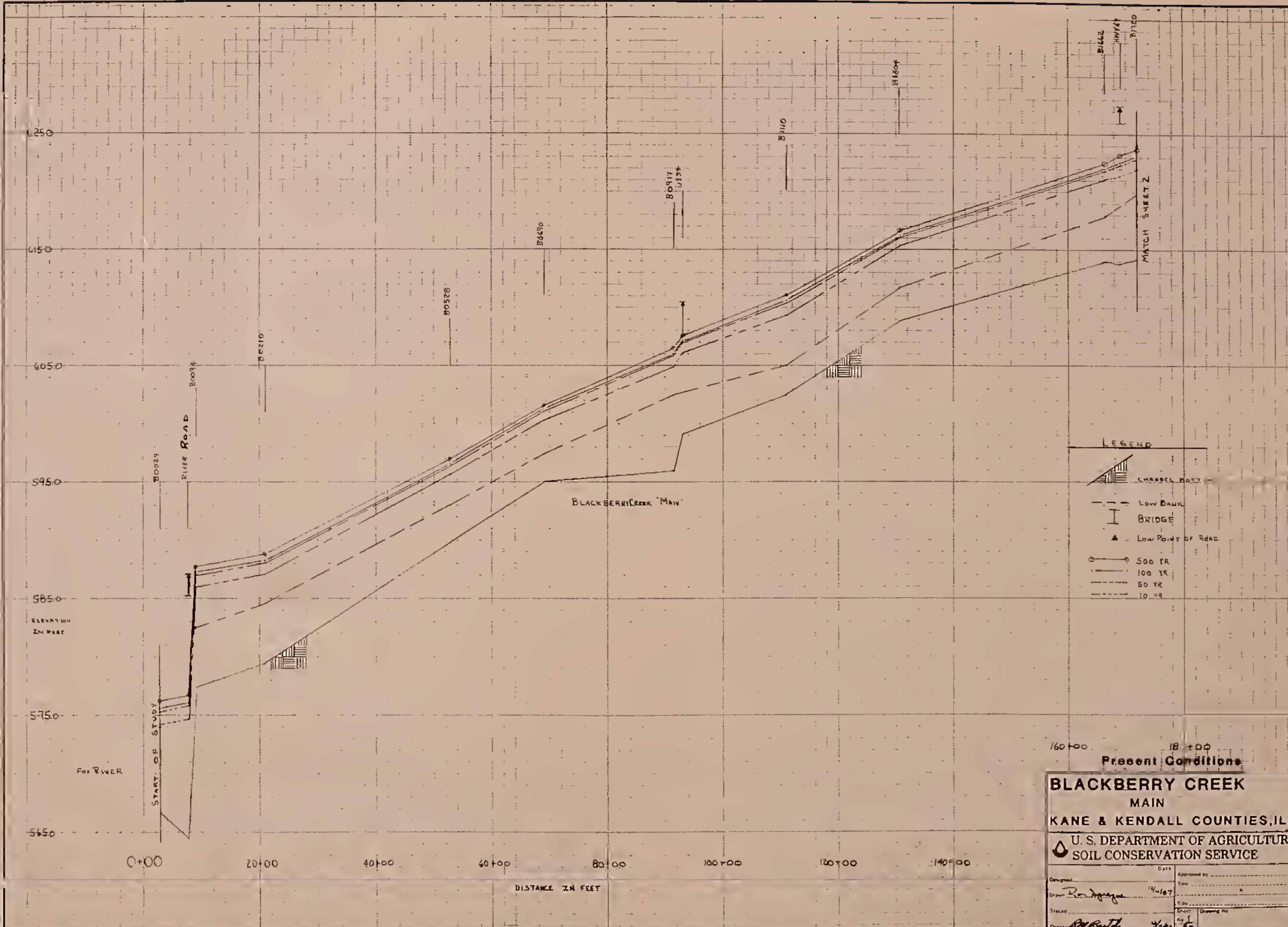
PROJECT NO
WL-1399

BLACKBERRY CREEK
KANE AND KENDALL COUNTIES

50

OVERFLOW INTO MONTGOMERY FROM BLACKBERRY CREEK SECTIONS AA - FF

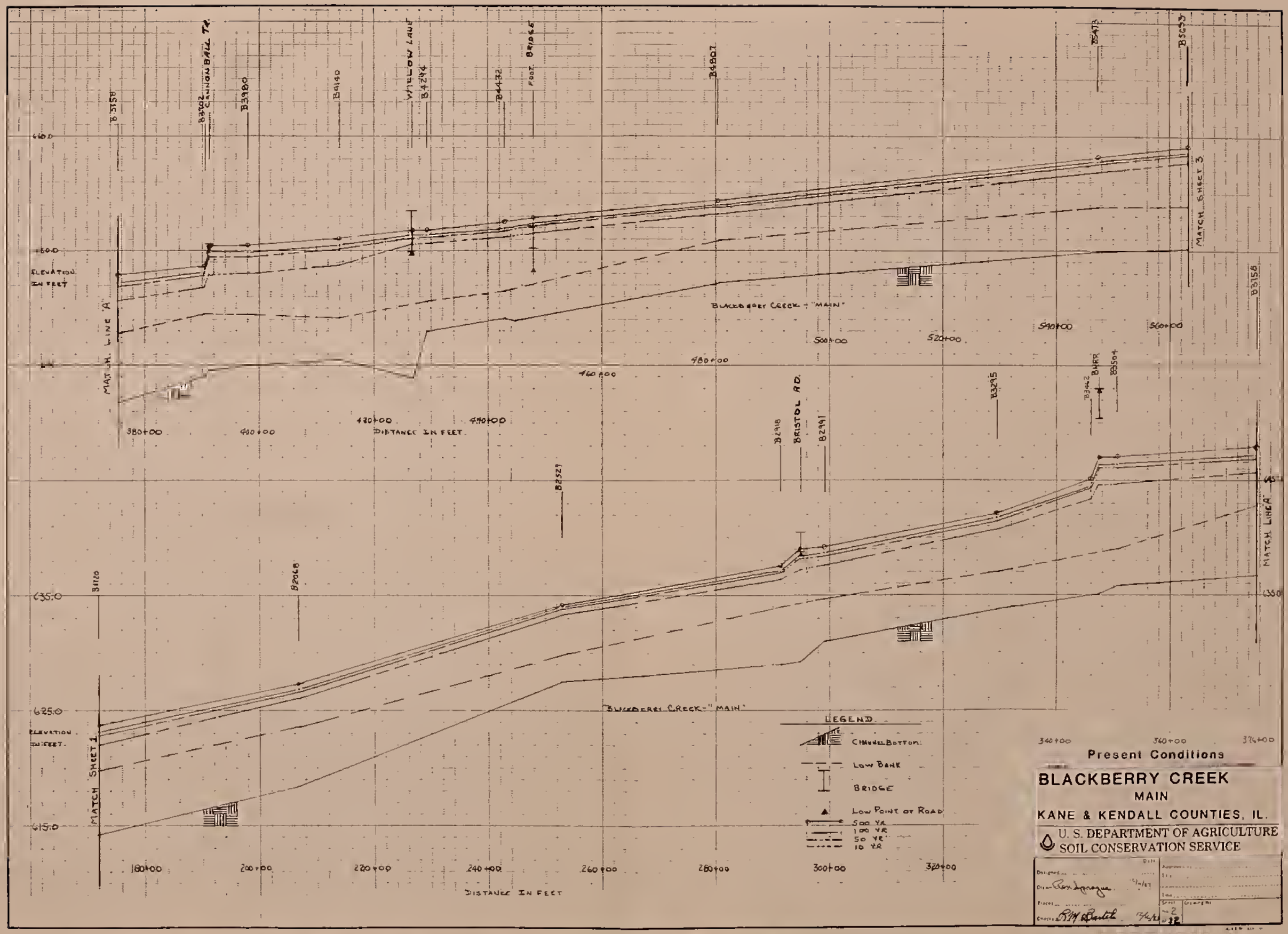
SHEET 23 OF 23



625.0
615.0
605.0
595.0
585.0
575.0
565.0
ELEVATION IN FEET
0+00
20+00
40+00
60+00
80+00
100+00
120+00
140+00
160+00
DISTANCE IN FEET
START OF STUDY
FOX RIVER
RIVER ROAD
BLACKBERRY CREEK "MAIN"
MATCH SHEET 2
LEGEND
CHANNEL BOTT.
LOW BANK
BRIDGE
LOW POINT OF ROAD
500 YR
100 YR
50 YR
10 YR
Present Conditions
BLACKBERRY CREEK
MAIN
KANE & KENDALL COUNTIES, IL.
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

APPENDIX A

APPENDIX A

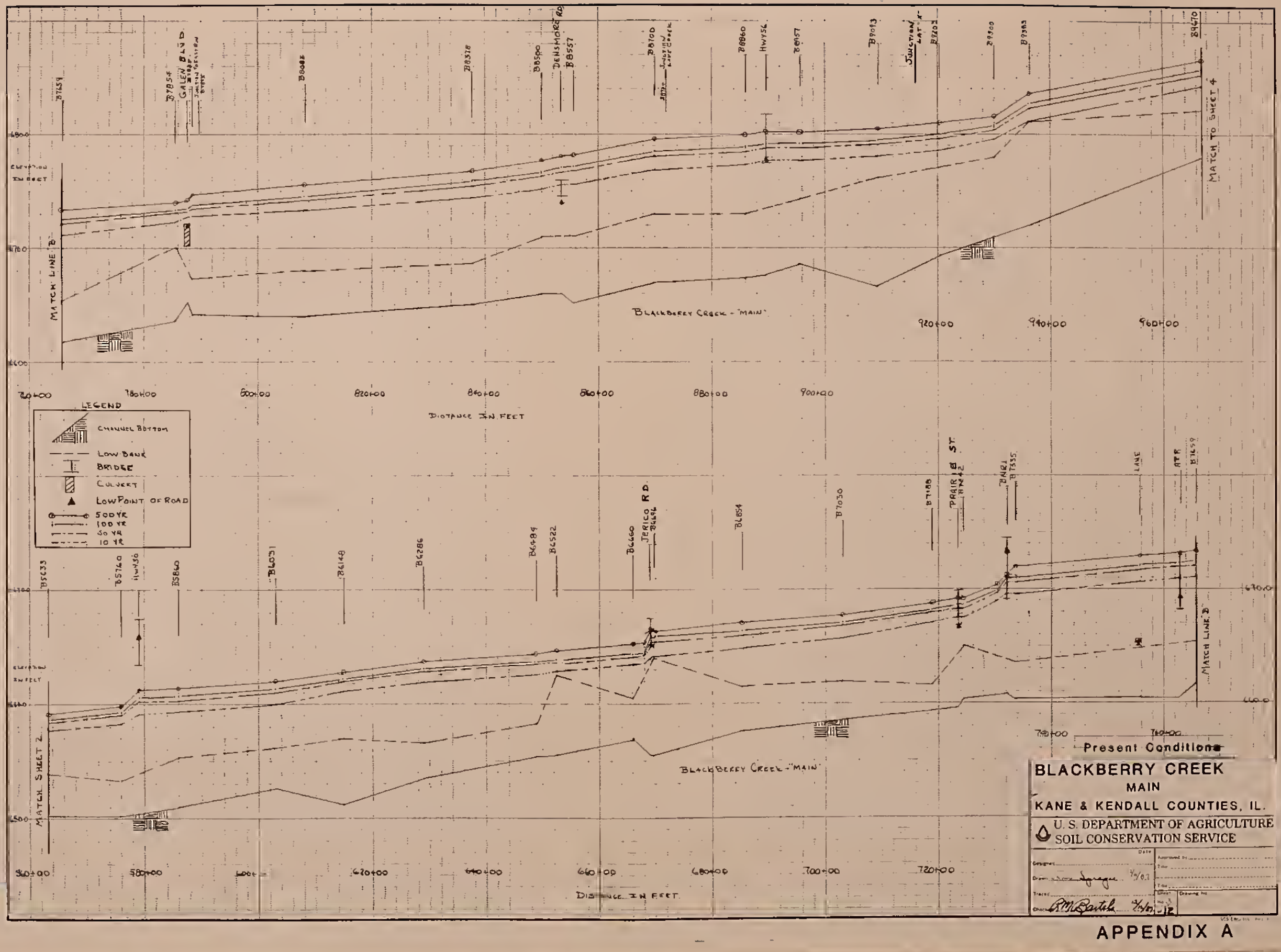


Present Conditions

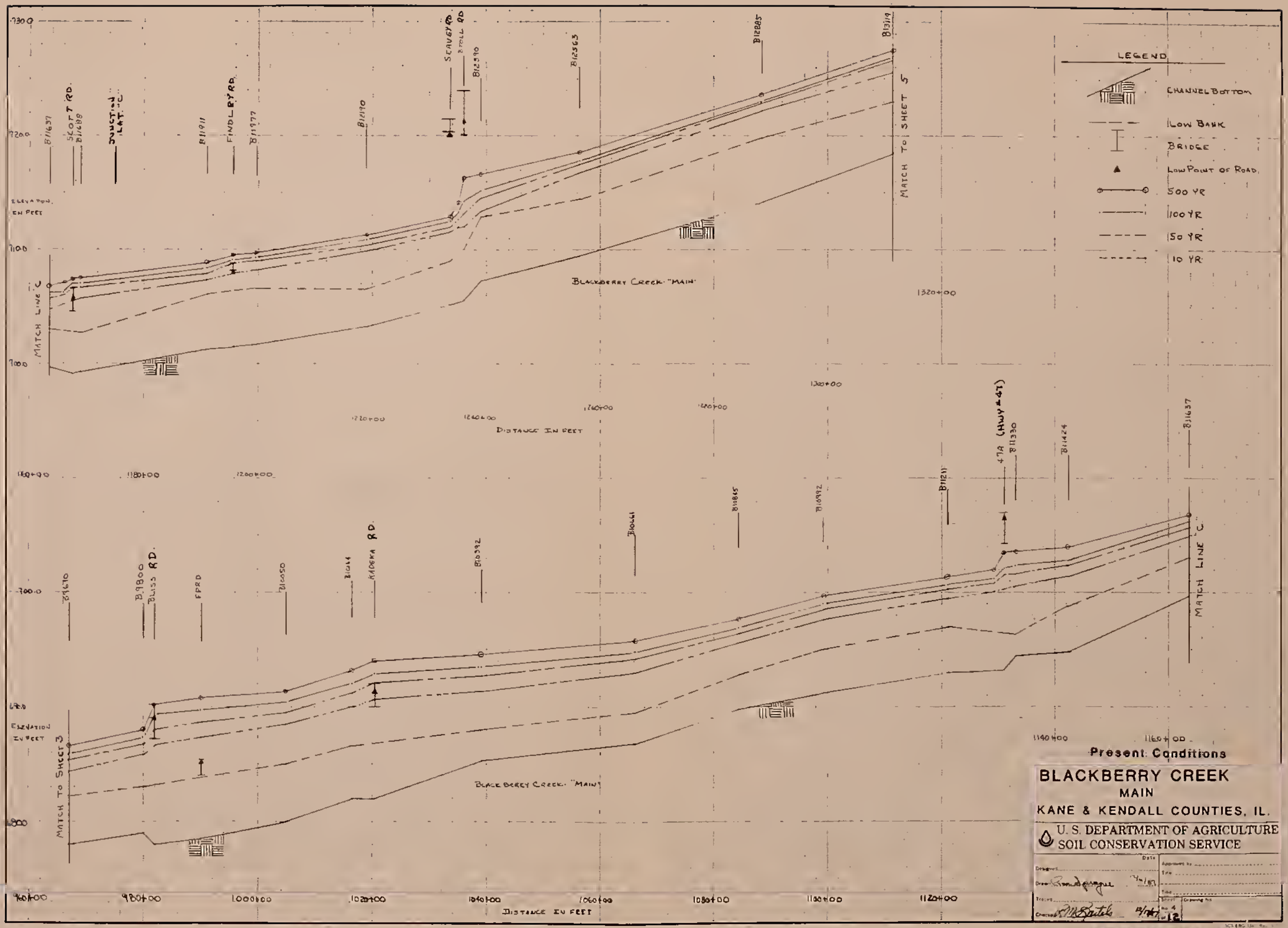
BLACKBERRY CREEK
MAIN
KANE & KENDALL COUNTIES, IL.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

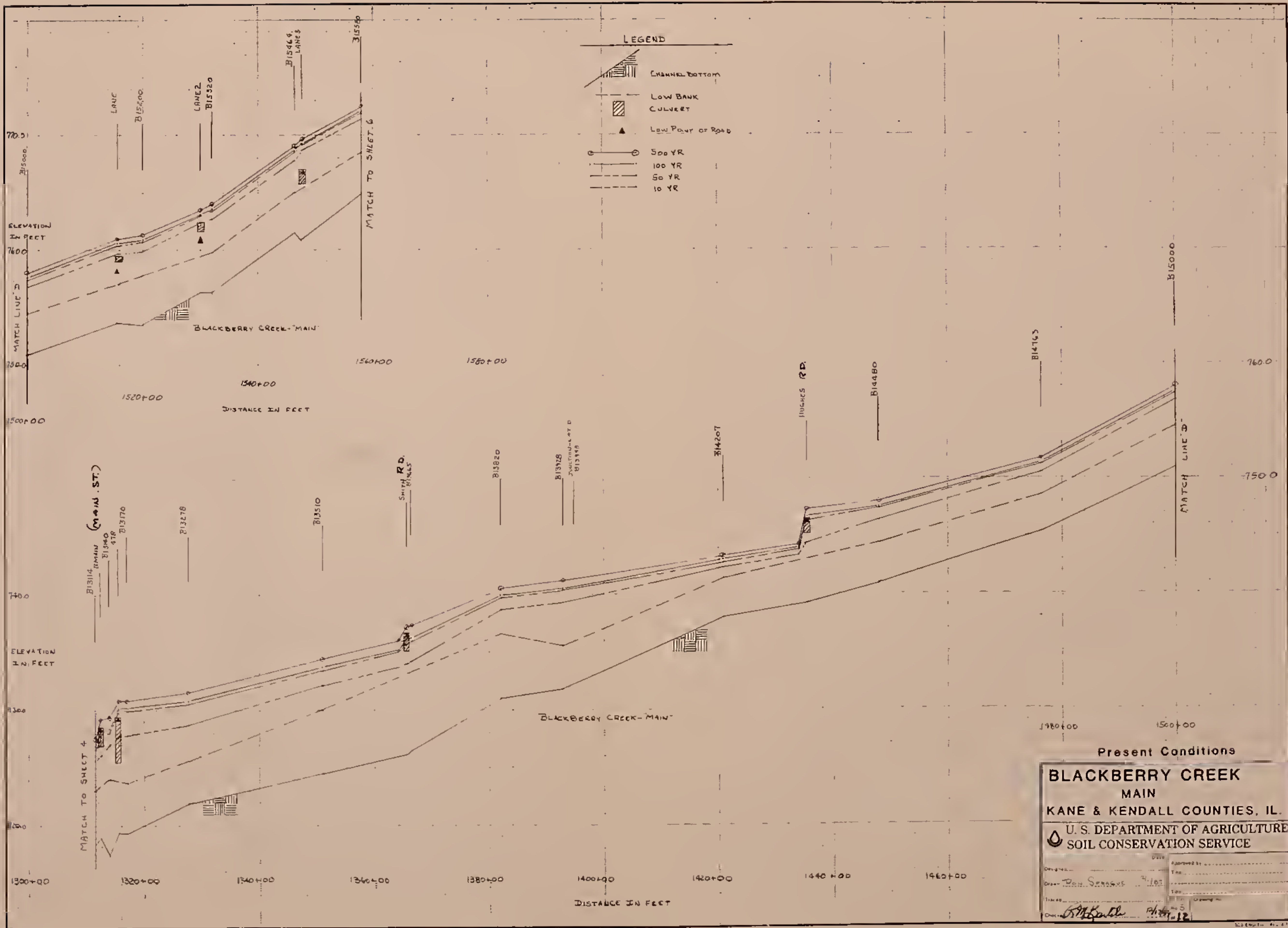
APPENDIX A


MATCH TO SHEET 4
MATCH LINE B
BLACKBERRY CREEK - "MAIN"
DISTANCE IN FEET
LEGEND
CHANNEL BOTTOM
LOW BANK
BRIDGE
CULVERT
LOW POINT OF ROAD
50 YR
100 YR
50 YR
10 YR
GALEN BLVD.
DENSMORE RD.
HWY 56
JERICO RD.
PRAIRIE ST.
ATR
MATCH LINE B
MATCH SHEET 2
BLACKBERRY CREEK - "MAIN"
DISTANCE IN FEET
Present Conditions
BLACKBERRY CREEK
MAIN
KANE & KENDALL COUNTIES, IL.
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

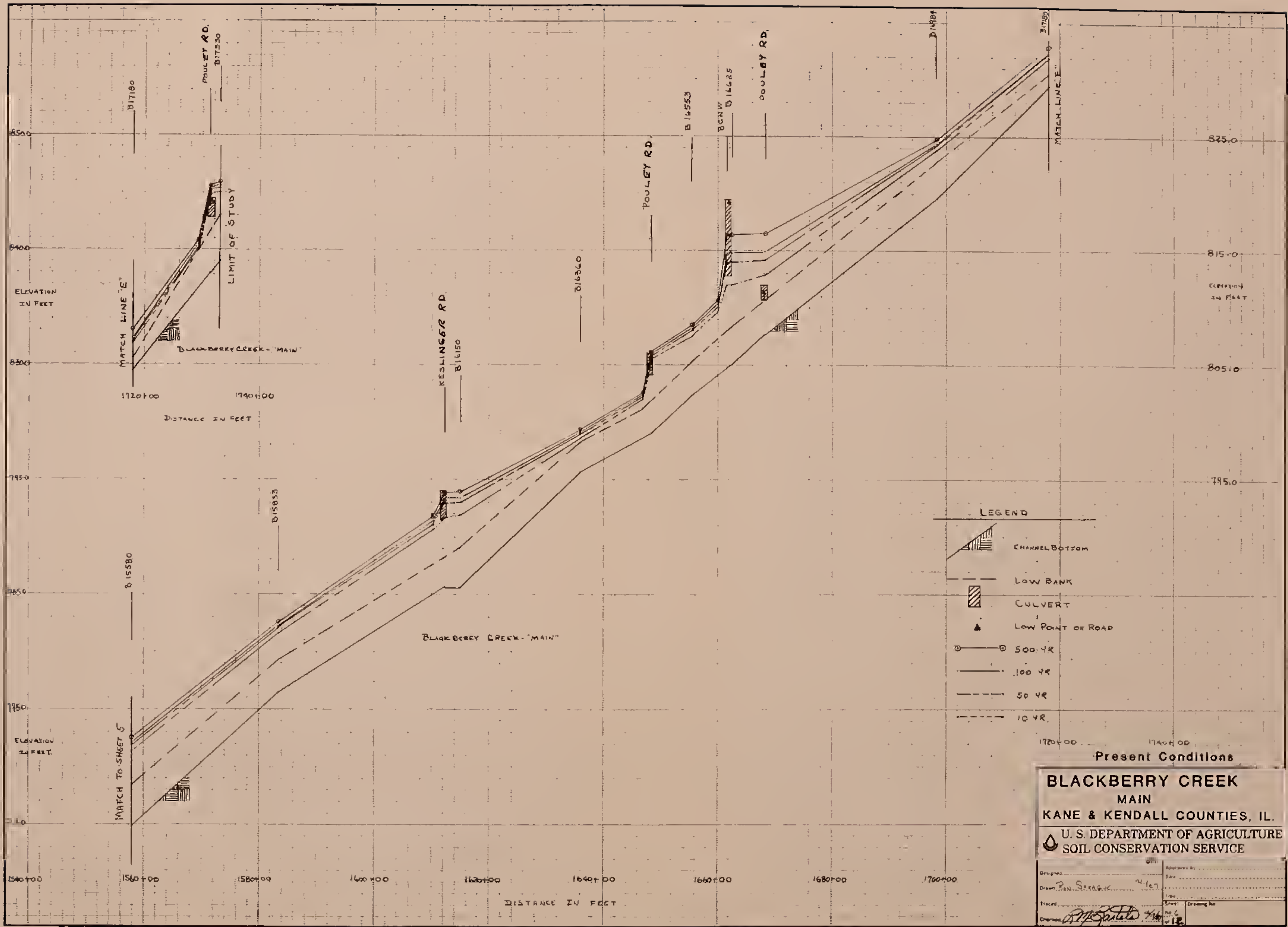
APPENDIX A


LEGEND
CHANNEL BOTTOM
LOW BANK
BRIDGE
LOW POINT OF ROAD
500 YR
100 YR
50 YR
10 YR
SCOTT RD.
JUNCTION LAT. C
FINDLEY RD.
SEAVER RD.
KRUEGER RD.
BLISS RD.
KROEKA RD.
FPRD
MATCH LINE C
MATCH TO SHEET 5
MATCH TO SHEET 3
BLACKBERRY CREEK "MAIN"
DISTANCE IN FEET
ELEVATION IN FEET
Present Conditions
BLACKBERRY CREEK
MAIN
KANE & KENDALL COUNTIES, IL.
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

APPENDIX A

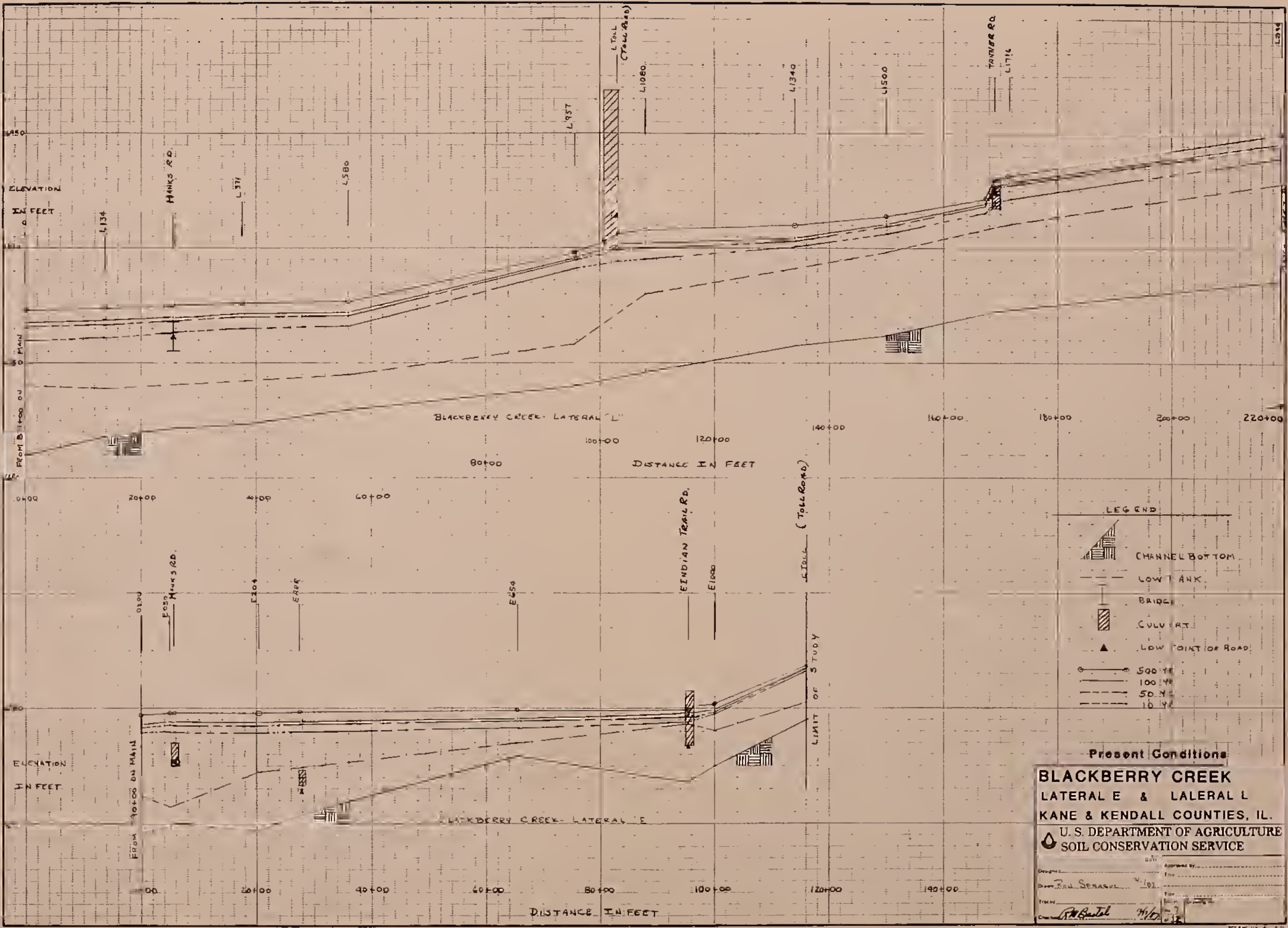

LEGEND
CHANNEL BOTTOM
LOW BANK
CULVERT
LOW POINT OF ROAD
500 YR
100 YR
50 YR
10 YR
ELEVATION IN FEET
DISTANCE IN FEET
BLACKBERRY CREEK-"MAIN"
MATCH LINE 'A'
MATCH TO SHEET 6
MATCH TO SHEET 4
HUGHES RD.
SMITH RD.
(MAIN ST.)
Present Conditions
BLACKBERRY CREEK
MAIN
KANE & KENDALL COUNTIES, IL.
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

APPENDIX A

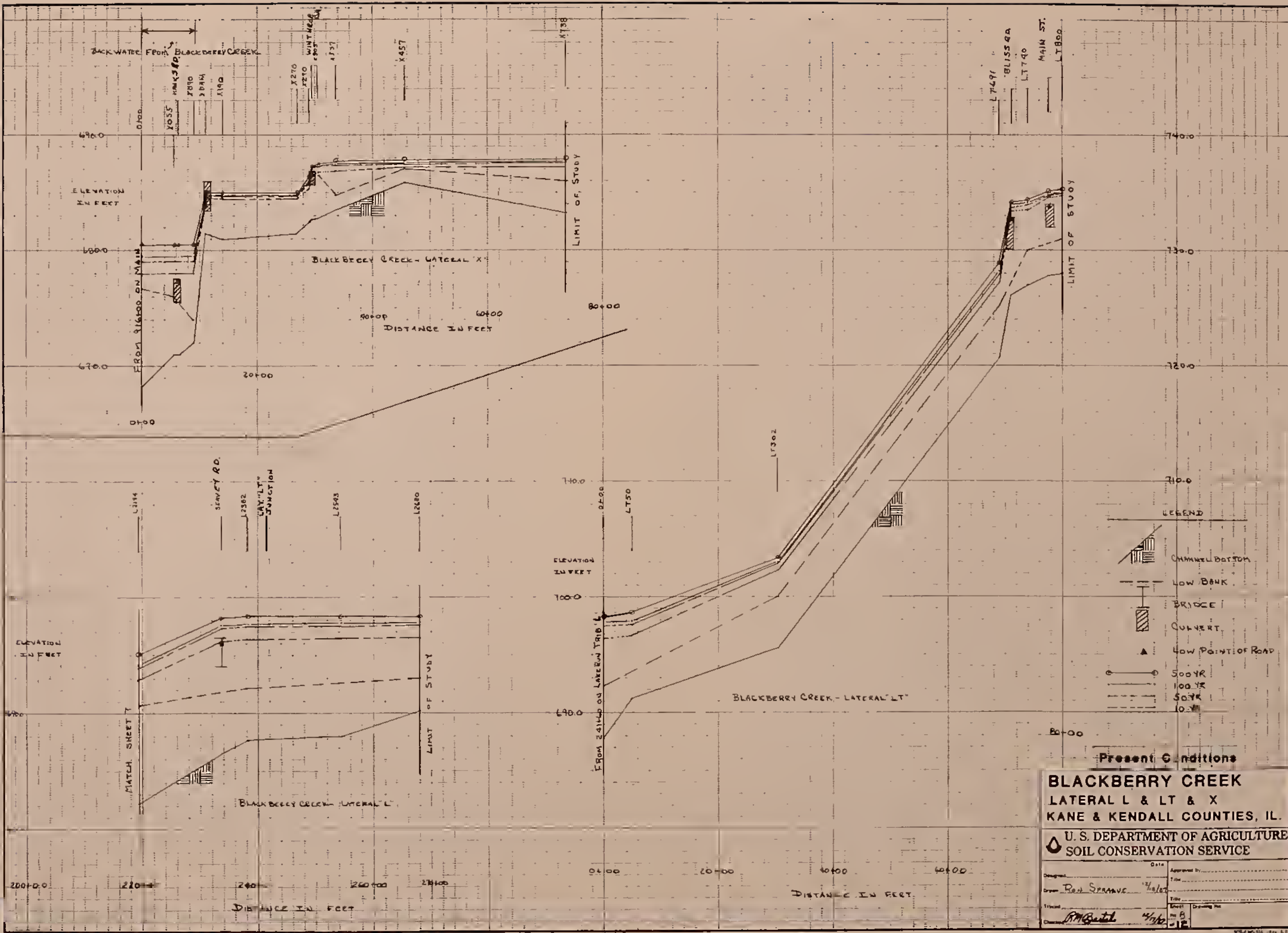


POOLEY RD.
B17530
B17180
LIMIT OF STUDY
MATCH LINE "E"
BLACKBERRY CREEK - "MAIN"
ELEVATION IN FEET
850.0
840.0
830.0
1720+00
1740+00
DISTANCE IN FEET
KESLINGER RD.
B16150
B16360
POOLEY RD.
B16553
BCNW B16625
POOLEY RD.
B17184
B17180
MATCH LINE "E"
825.0
815.0
805.0
795.0
ELEVATION IN FEET
B15833
B15580
BLACKBERRY CREEK - "MAIN"
MATCH TO SHEET 5
LEGEND
CHANNEL BOTTOM
LOW BANK
CULVERT
LOW POINT OF ROAD
500 YR
100 YR
50 YR
10 YR
1720+00
1740+00
1540+00
1560+00
1580+00
1600+00
1620+00
1640+00
1660+00
1680+00
1700+00
DISTANCE IN FEET
Present Conditions
BLACKBERRY CREEK
MAIN
KANE & KENDALL COUNTIES, IL.
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

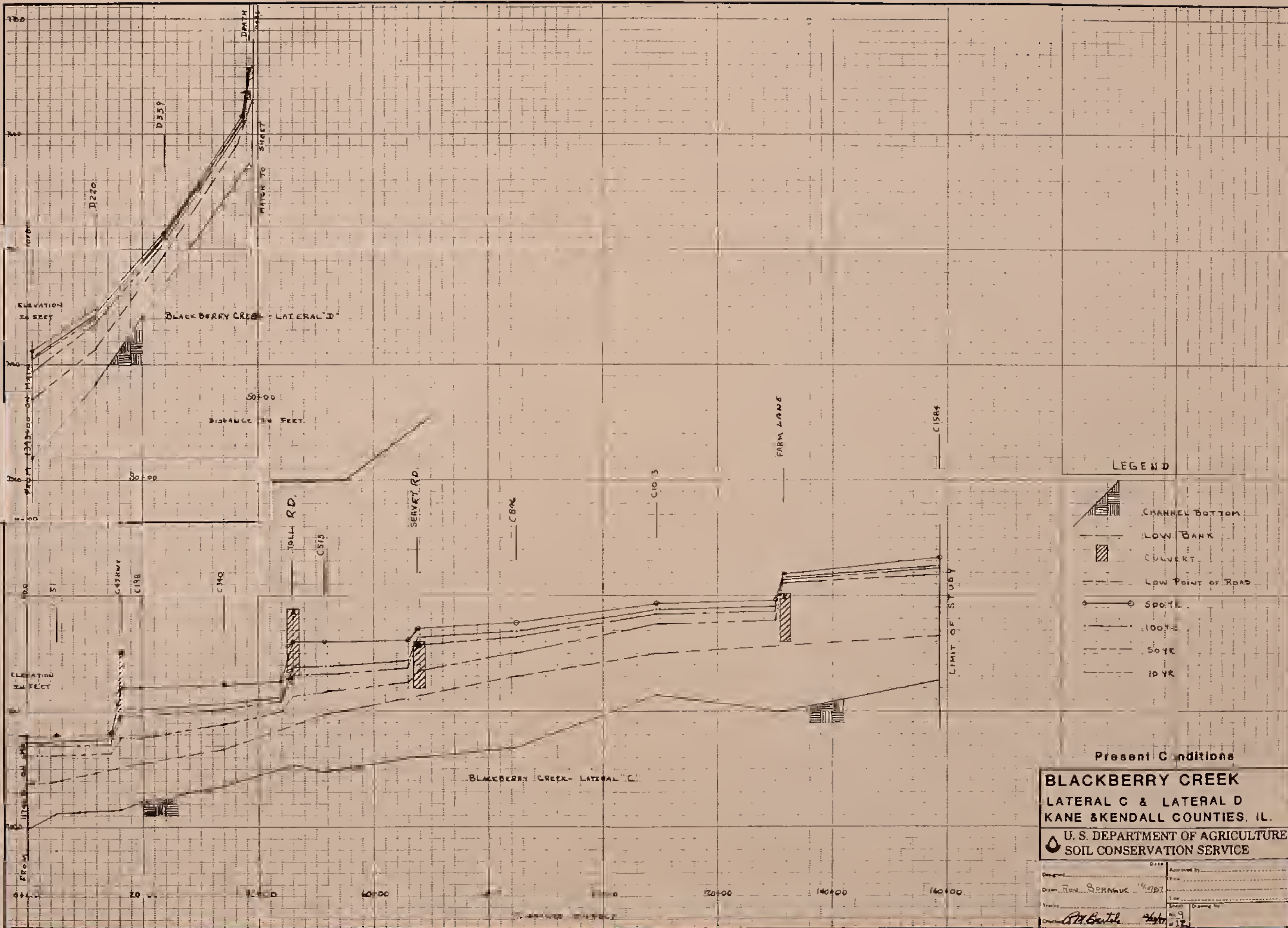
APPENDIX A


Present Conditions
BLACKBERRY CREEK
LATERAL E & LALERAL L
KANE & KENDALL COUNTIES, IL.
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BLACKBERRY CREEK- LATERAL "L"
BLACKBERRY CREEK- LATERAL E
DISTANCE IN FEET
ELEVATION IN FEET
FROM 0+00 ON MAIN
LIMIT OF STUDY
HANKS RD.
TANNER RD.
INDIAN TRAIL RD.
(TOLL ROAD)
LEGEND
CHANNEL BOTTOM
BRIDGE
CULVERT
LOW POINT OF ROAD
500 YR
100 YR
20+00
40+00
60+00
80+00
100+00
120+00
140+00
160+00
180+00
200+00
220+00

APPENDIX A


BACKWATER FROM BLACKBERRY CREEK
ELEVATION IN FEET
LIMIT OF STUDY
BLACKBERRY CREEK - LATERAL "X"
DISTANCE IN FEET
FROM 216+00 ON MAIN
BLACKBERRY CREEK - LATERAL "L"
MATCH SHEET 7
SENCEY RD.
"LAT. "LT" JUNCTION"
FROM 241+00 ON LAKE RUN TRIB.
BLACKBERRY CREEK - LATERAL "LT"
MAIN ST.
LEGEND
CHANNEL BOTTOM
LOW BANK
BRIDGE
CULVERT
LOW POINT OF ROAD
500 YR
100 YR
50 YR
10 YR
Present Conditions
BLACKBERRY CREEK
LATERAL L & LT & X
KANE & KENDALL COUNTIES, IL.
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

APPENDIX A

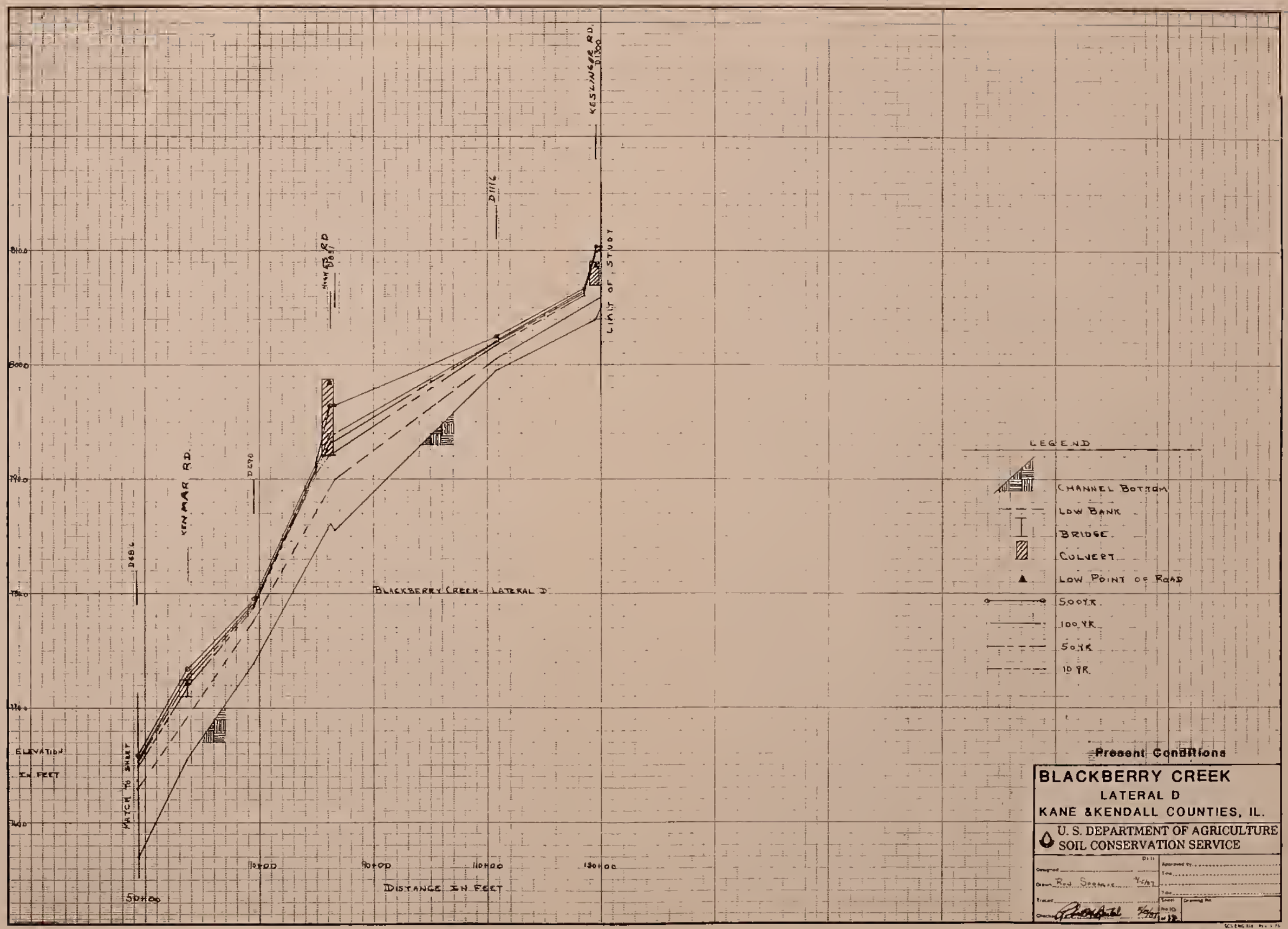


BLACKBERRY CREEK

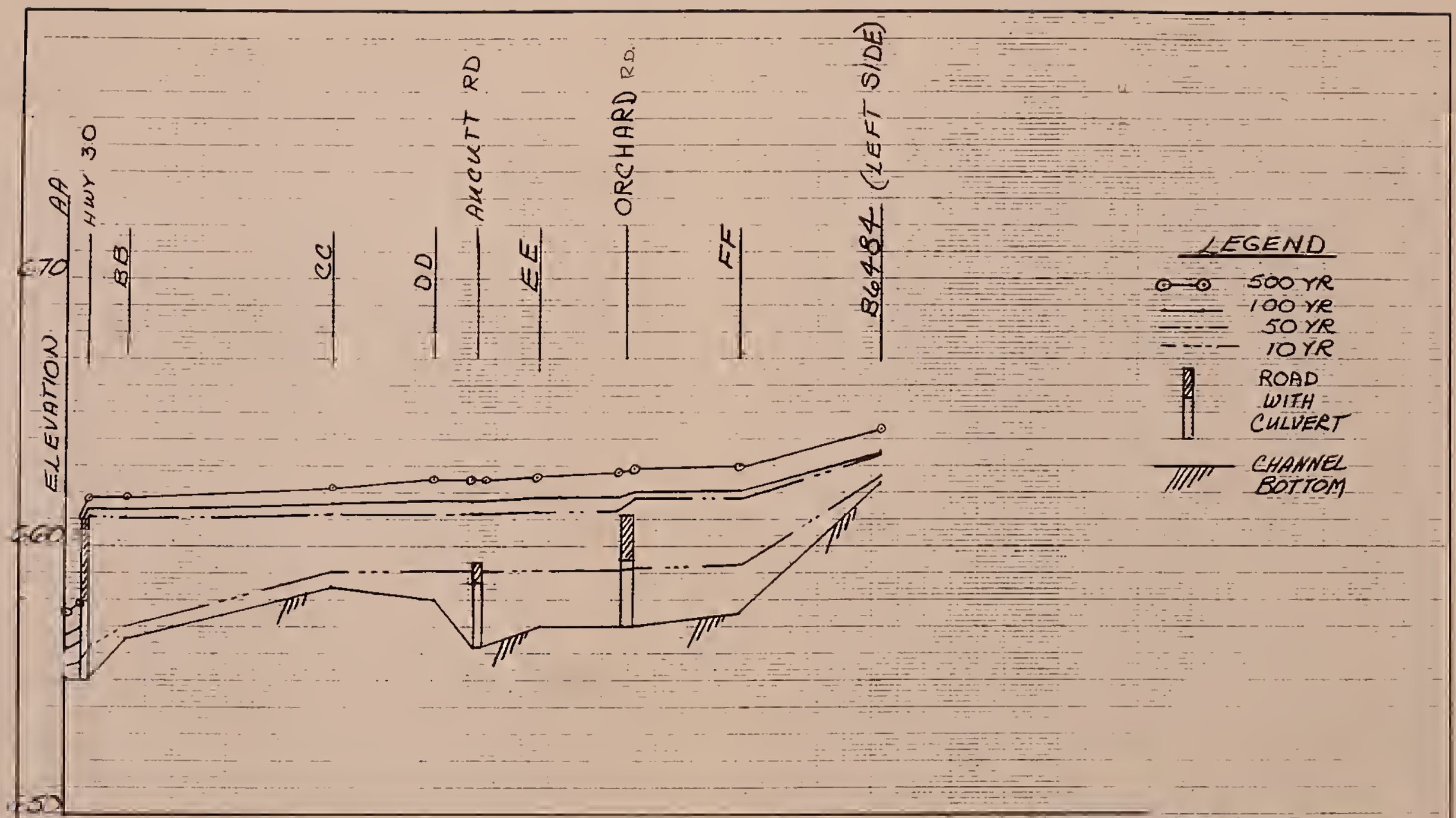
LATERAL C & LATERAL D
KANE & KENDALL COUNTIES, IL.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

APPENDIX A


KESLINGER RD.
D1300
D1116
LIMIT OF STUDY
KENMAR RD.
D670
D686
BLACKBERRY CREEK - LATERAL D
ELEVATION IN FEET
MATCH TO SHEET
5D+00
70+00
90+00
110+00
130+00
DISTANCE IN FEET
LEGEND
CHANNEL BOTTOM
LOW BANK
BRIDGE
CULVERT
LOW POINT OF ROAD
500 YR.
100 YR.
50 YR.
10 YR.
Present Conditions
BLACKBERRY CREEK
LATERAL D
KANE & KENDALL COUNTIES, IL.
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

APPENDIX A



KANE CO. IL

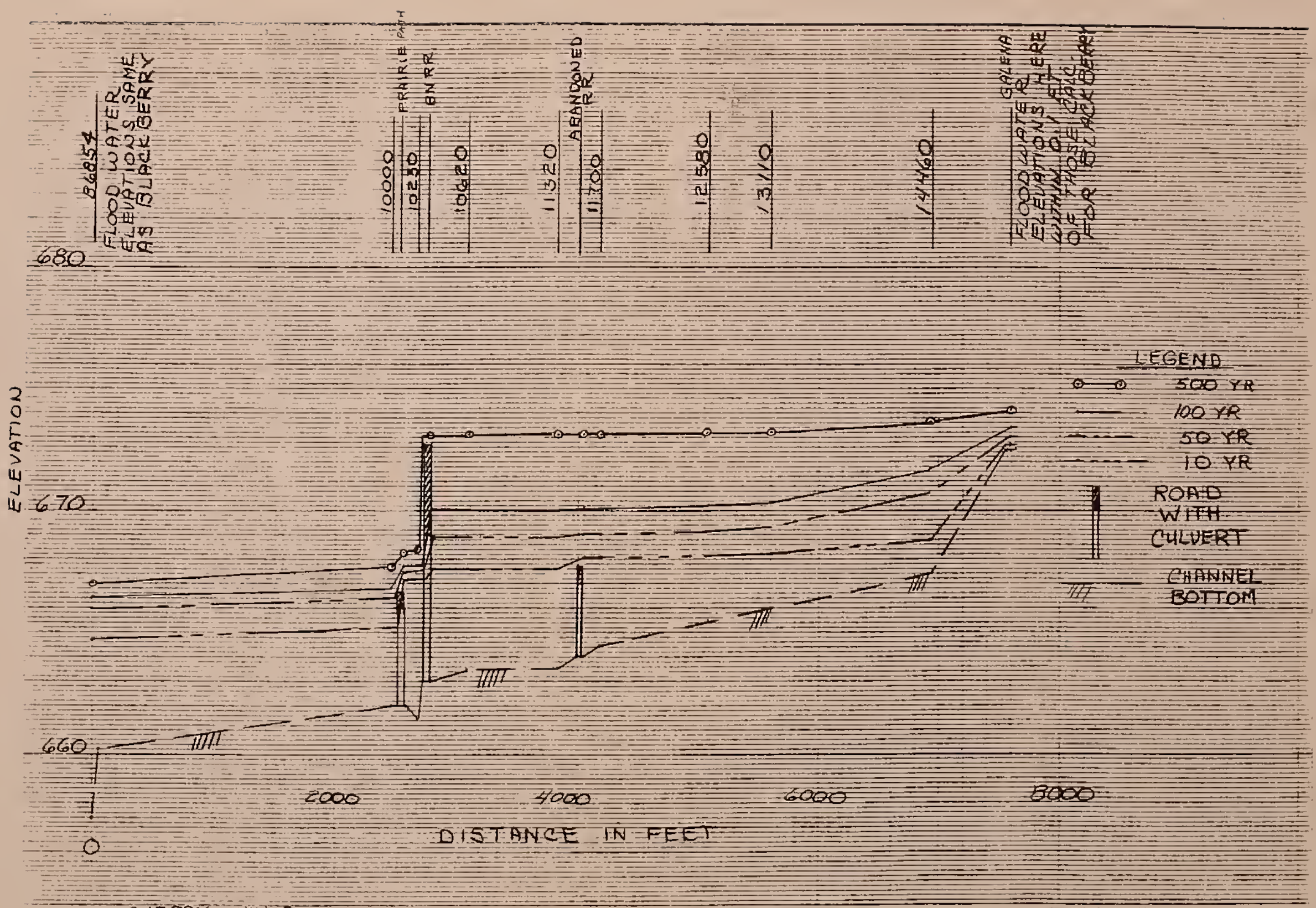
MONTGOMERY
OVERFLOW AREA
AA TO B6484
BLACKBERRY CREEK FMS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed
Drawn R.M.B 7/
Traced
Checked
Date
Approved by
Title
Title
Sheet No 11 of 12
Drawing No

SCS-ENG-316A (Rev. 1-76)

APPENDIX A



CHERRY HILLS
OVERFLOW AREA
B6854 TO GALENA RD
BLACKBERRY CREEK FMS

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
KANE-DUPAGE AND KENDALL CO.
SOIL CONSERVATION DISTRICT

DRAWING NUMBER
DATE 12 12 SHEET
7/25/88 R.M.B.

APPENDIX A

U S DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

VICINITY MAP

NATURAL STORAGE RESERVOIRS IN TR-20 MODEL

ELBURN

MAIN ST.

SUGAR GROVE

HWY 56

OAKEN'S RD

BURLINGTON NORTHERN

JERICO RD

KANE COUNTY / KENDALL COUNTY

MONTGOMERY

AURORA

NORTH AURORA

EAST WEST TOLLWAY

LAKE RUN

EAST RUN

BLACKBERRY CREEK

LATERAL C

LATERAL X

HWY 47

Yorkville

10 11 15 50 52 19 31 54 60 62 71 65 43

LEGEND

- WATERSHED BOUNDARY
- FOREST PRESERVE
- COUNTY LINE
- G.L.O. TOWNSHIP LINE
- SECTION LINE
- CITY LIMITS
- TOWN
- FEDERAL HIGHWAY
- STATE HIGHWAY
- COUNTY HIGHWAY
- DIVIDED ROAD
- PRIMARY ROAD
- SECONDARY ROAD
- RAILROAD
- DRAINAGE
- LAKE
- SWAMP OR MARSH
- POWER TRANSMISSION LINE
- CEMETERY

APPENDIX E

BLACKBERRY CREEK WATERSHED
KANE AND KENDALL COUNTIES
ILLINOIS

E- 1

APPENDIX B

APPENDIX B
SUMMARY OF FLOOD PEAK DISCHARGES AND FLOOD CRESTS
BY VALLEY SECTIONS
BLACKBERRY CREEK

Map	Cross Section	Bottom Elev	2 Year Q	2 Year Elev	10 Year Q	10 Year Elev	100 Year Q	100 Year Elev	500 Year Q	500 Year Elev
1	B0029	566.6	1130	570.9	2190	574.1	3420	575.6	4030	576.2
1	B0094	577.4	"	584.5	"	586.0	"	587.3	"	587.7
1	B0210	579.5	"	585.8	"	587.1	"	588.3	"	588.8
1	B0528	589.8	"	594.6	"	595.7	"	596.6	"	596.8
1	B0690	595.0	"	599.3	"	600.3	"	601.3	"	601.6
1	B0917	596.0	"	603.3	"	604.8	"	606.0	"	606.5
1	B1110	602.5	"	607.8	"	609.4	"	610.6	"	611.1
1	B1304	608.8	"	614.3	"	615.3	"	616.2	"	616.7
1	B1662	614.0	"	619.8	"	621.1	"	622.0	"	622.4
2	B1720	614.2	1120	620.6	2180	622.0	3400	623.1	4010	623.7
2	B2068	618.0	"	625.2	"	626.0	"	626.8	"	627.3
2	B2529	627.5	"	632.3	"	633.3	"	634.0	"	634.2
3	B2918	629.0	"	635.4	"	636.4	"	637.1	"	637.6
3	B2991	631.0	"	636.4	"	637.5	"	638.7	"	639.3
3	B3295	633.7	"	639.6	"	640.7	"	641.7	"	642.1
3	B3504	635.8	"	642.3	"	644.7	"	646.4	"	647.1
3	B3758	636.7	"	644.0	"	645.7	"	647.2	"	647.9
3	B3902	639.0	1100	645.2	2140	646.8	3340	648.1	3940	648.7
3	B3980	640.0	"	646.0	"	648.0	"	649.9	"	650.5
3	B4140	640.5	"	647.5	"	648.8	"	650.5	"	651.1
3	B4294	643.0	"	648.8	"	650.6	"	651.4	"	651.8
3	B4432	644.2	"	649.6	"	651.2	"	652.0	"	652.5
4	B4807	647.2	"	652.1	"	653.2	"	654.0	"	654.4
4	B5473	649.9	"	655.8	"	656.9	"	657.8	"	658.3
4	B5633	650.2	"	656.5	"	657.7	"	658.6	"	659.1

APPENDIX B
SUMMARY OF FLOOD PEAK DISCHARGES AND FLOOD CRESTS
BY VALLEY SECTIONS
BLACKBERRY CREEK

Map	Cross Section	Bottom Elev	2 Year Q	2 Year Elev	10 Year Q	10 Year Elev	100 Year Q	100 Year Elev	500 Year Q	500 Year Elev
5	B5760	650.2	1120	657.0	2170	658.3	3390	659.3	4000	659.7
5	B5860	651.0	"	657.5	"	659.2	"	660.7	"	661.4
5	B6031	652.6	"	658.7	"	659.9	"	661.3	"	661.9
5	B6148	651.2	1125	659.7	2180	661.0	3410	662.2	4090	662.8
5	B6286	653.5	1130	660.3	2190	661.8	3420	663.1	4100	663.7
5	B6484	655.4	1230	661.1	2380	662.5	3970	663.7	5280	664.4
5	B6522	655.5	1230	661.6	2460	662.8	"	663.9	"	664.6
5	B6660	657.0	"	662.4	"	663.4	"	664.5	"	665.2
5	B6696	655.5	"	662.5	"	664.0	"	665.9	"	666.5
5	B6854	657.6	"	663.4	"	664.7	"	666.4	"	667.0
5	B7030	658.5	1180	664.4	2320	665.8	3370	667.1	4080	667.8
5	B7188	659.3	"	665.7	"	667.1	"	668.2	"	668.8
5	B7242	660.3	"	666.1	"	667.5	"	668.6	"	669.2
5	B7335	660.3	"	667.8	"	669.6	"	671.0	"	672.0
6	LANE	660.5	"	668.8	"	670.7	"	672.1	"	673.0
6	APR	660.5	"	669.0	"	671.0	"	672.3	"	673.1
6	B7659	661.7	"	669.2	"	671.1	"	672.5	"	673.3
6	B7854	663.6	"	670.7	2320	672.3	"	673.3	"	674.0
6	B7885	664.2	1220	671.1	2310	672.8	4350	673.8	6010	674.7
6	B8083	664.0	1110	671.6	2100	673.3	3970	674.6	5480	675.6
6	B8378	665.1	"	672.9	"	674.4	"	675.9	"	676.9
9	B8500	666.0	"	673.7	"	675.2	"	676.6	"	677.7
9	B8557	665.2	"	674.2	"	675.6	"	677.2	"	678.2
9	B8770	667.0	"	675.4	"	676.9	"	678.5	"	679.6
9	B8860	667.4	780	675.9	1560	677.3	3120	679.0	4310	680.0
9	B8957	668.6	"	676.1	"	677.7	"	679.2	"	680.2

SUMMARY OF FLOOD PEAK DISCHARGES AND FLOOD CRESTS
BY VALLEY SECTIONS
BLACKBERRY CREEK

Map	Cross Section	Bottom Elev	2 Year Q	2 Year Elev	10 Year Q	10 Year Elev	100 Year Q	100 Year Elev	500 Year Q	500 Year Elev
12	B9093	666.6	"	676.5	"	678.0	3120	679.5	"	680.5
12	B9203	669.2	"	677.4	1550	678.6	3100	680.0	4280	681.0
12	B9300	671.0	"	678.6	"	679.6	"	680.8	"	681.6
12	B9383	672.0	"	679.6	"	681.2	"	682.7	"	683.6
12	B9670	678.0	"	683.3	"	684.3	"	685.8	"	686.6
16	B9800	679.0	750	684.8	1500	685.8	3000	687.3	4140	688.0
16	FPRD	678.5	"	686.0	"	687.3	"	689.7	"	690.7
16	B10050	680.0	"	687.3	"	688.5	"	690.4	"	691.4
16	B10164	682.0	"	688.5	"	690.0	"	692.0	"	693.2
16	B10392	685.3	"	690.1	"	691.4	"	693.5	"	694.6
16	B10661	686.8	730	691.9	1450	693.0	2900	694.8	4000	695.8
16	B10845	689.8	"	694.5	"	695.6	"	696.9	"	697.7
16	B10992	691.2	"	696.5	"	697.6	"	699.0	"	699.7
16	B11211	693.0	"	698.6	"	699.5	"	700.7	"	701.46
19	B11330	694.4	"	699.5	1450	700.5	2900	702.3	"	703.6
19	B11424	694.8	"	700.5	1450	701.4	"	702.8	"	704.0
19	B11637	699.7	"	704.3	"	704.9	"	706.2	"	706.8
19	B11688	699.3	"	704.6	"	705.7	"	707.0	"	707.5
19	B11911	701.2	480	706.6	970	707.3	1930	708.4	2660	708.9
19	B11977	701.7	"	707.3	"	708.2	"	709.3	"	709.7
19	B12190	703.3	"	709.0	"	709.9	"	710.9	"	711.3
19	B12390	707.3	460	712.1	930	713.4	1850	715.2	2550	716.7
19	B12563	709.5	440	715.8	940	716.8	"	717.8	2440	718.6
20	B12885	714.2	430	721.3	920	722.2	1800	723.0	2380	723.6
20	B13114	718.5	"	724.3	920	725.6	"	726.9	"	727.5
20	B13140	717.5	"	725.3	"	727.0	"	728.4	"	729.4
20	B13170	719.3	"	725.9	"	727.8	"	730.2	"	730.8
20	B13278	721.9	"	727.4	"	728.7	"	730.8	"	731.5
20	B13510	724.5	420	730.9	890	732.1	1750	733.7	2310	734.4
20	B13665	726.5	"	732.9	"	734.2	"	736.2	"	737.3

SUMMARY OF FLOOD PEAK DISCHARGES AND FLOOD CRESTS
BY VALLEY SECTIONS
BLACKBERRY CREEK

Map	Cross Section	Bottom Elev	2 Year Q	2 Year Elev	10 Year Q	10 Year Elev	100 Year Q	100 Year Elev	500 Year Q	500 Year Elev
18	B13820	731.0	420	737.8	890	738.7	1750	739.9	2310	740.5
18	B13928	731.8	"	738.3	"	739.3	"	740.5	"	741.2
18	B14207	738.0	290	741.9	610	742.3	1200	743.0	1580	743.3
14	B14480	740.9	280	745.9	600	746.4	1170	747.5	1540	748.0
14	B14763	745.4	"	750.1	"	750.5	"	751.3	"	751.7
14	B15000	750.9	"	756.1	"	756.8	"	757.6	"	758.0
14	B15200	753.5	"	759.2	"	759.9	"	760.9	"	761.3
14	B15320	756.3	"	762.0	"	762.7	"	763.6	"	764.0
14	B15464	761.5	350	766.9	740	767.8	"	768.6	1440	769.0
14	B15580	764.9	"	770.3	"	771.4	"	772.1	1440	772.5
14	B15833	776.5	330	780.8	690	781.6	1100	782.2	1350	782.6
14	B16150	785.6	"	790.5	700	791.9	1110	793.4	1370	793.9
14	B16360	795.1	260	798.1	550	798.6	870	799.1	1070	799.3
15	B16553	802.4	"	806.5	550	807.5	"	808.2	1070	808.5
15	B16525	805.1	"	809.7	"	812.0	"	814.8	"	816.4
15	B16984	819.6	270	823.2	570	823.9	900	824.4	1110	824.8
15	B17180	829.5	220	831.3	500	831.9	"	832.4	1210	832.9
15	B17330	839.0	120	842.9	280	845.0	520	845.6	690	845.9
					EAST RUN TRIBUTARY					
6	E050	664.7	170	671.2	300	672.9	450	674.0	620	674.9
6	E204	664.5	"	671.2	"	672.9	450	674.0	"	674.9
6	EARR	665.8	"	671.4	"	672.9	"	674.0	"	674.9
6	E654	670.8	"	672.3	"	673.2	"	674.2	"	675.0
7	E1000	670.0	150	674.1	270	674.4	400	674.9	550	675.5

SUMMARY OF FLOOD PEAK DISCHARGES AND FLOOD CRESTS
BY VALLEY SECTIONS
BLACKBERRY CREEK

Map	Cross Section	Bottom Elev	2 Year Q	2 Year Elev	10 Year Q	10 Year Elev	100 Year Q	100 Year Elev	500 Year Q	500 Year Elev
					LAKE CREEK TRIBUTARY					
9	L134	668.6	360	675.7	680	677.1	1000	678.7	1300	679.8
9	L371	669.6	"	676.5	"	678.0	"	679.3	"	680.2
9	L580	670.9	"	676.8	"	678.2	"	679.4	"	680.3
9	L957	673.0	390	681.1	730	683.3	1080	684.0	1410	684.7
9	L1080	674.2	"	681.8	"	684.0	"	685.3	"	686.7
10	L1340	676.5	470	683.9	880	685.1	1300	686.0	1700	687.1
10	L1500	677.4	540	685.3	1080	686.3	1800	687.1	2410	687.8
10	L1716	679.6	560	687.9	1110	689.3	1860	690.7	2490	691.3
10	L2194	682.2	480	691.2	960	693.0	1600	694.3	2140	695.1
10	L2382	687.7	435	694.7	870	696.4	1450	697.7	1940	698.4
10	L2543	688.0	30	694.7	50	696.4	90	697.8	110	698.4
8	L2680	690.2	30	694.7	50	696.4	90	697.8	110	698.4
10	LT50	691.2	420	695.4	840	696.7	1400	697.9	1880	698.6
11	LT302	695.6	420	701.5	840	702.3	1400	703.0	1880	703.4
11	LT691	720.7	260	725.8	510	727.2	850	728.2	1140	728.9
11	LT740	727.0	"	731.7	"	733.5	"	734.1	"	734.4
11	LT800	728.0	240	734.1	480	734.7	800	735.0	1070	735.3

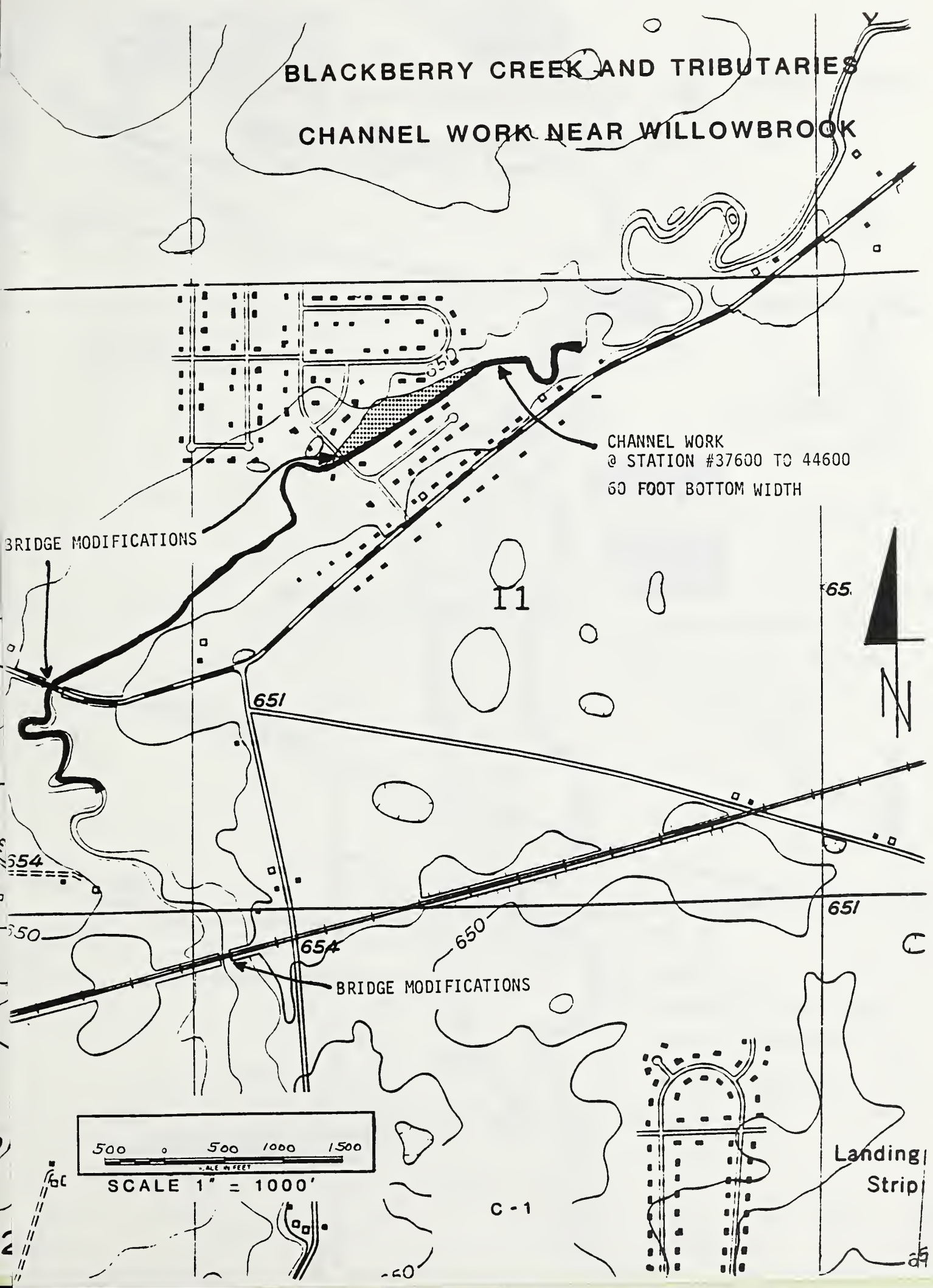
SUMMARY OF FLOOD PEAK DISCHARGES AND FLOOD CRESTS
BY VALLEY SECTIONS
BLACKBERRY CREEK

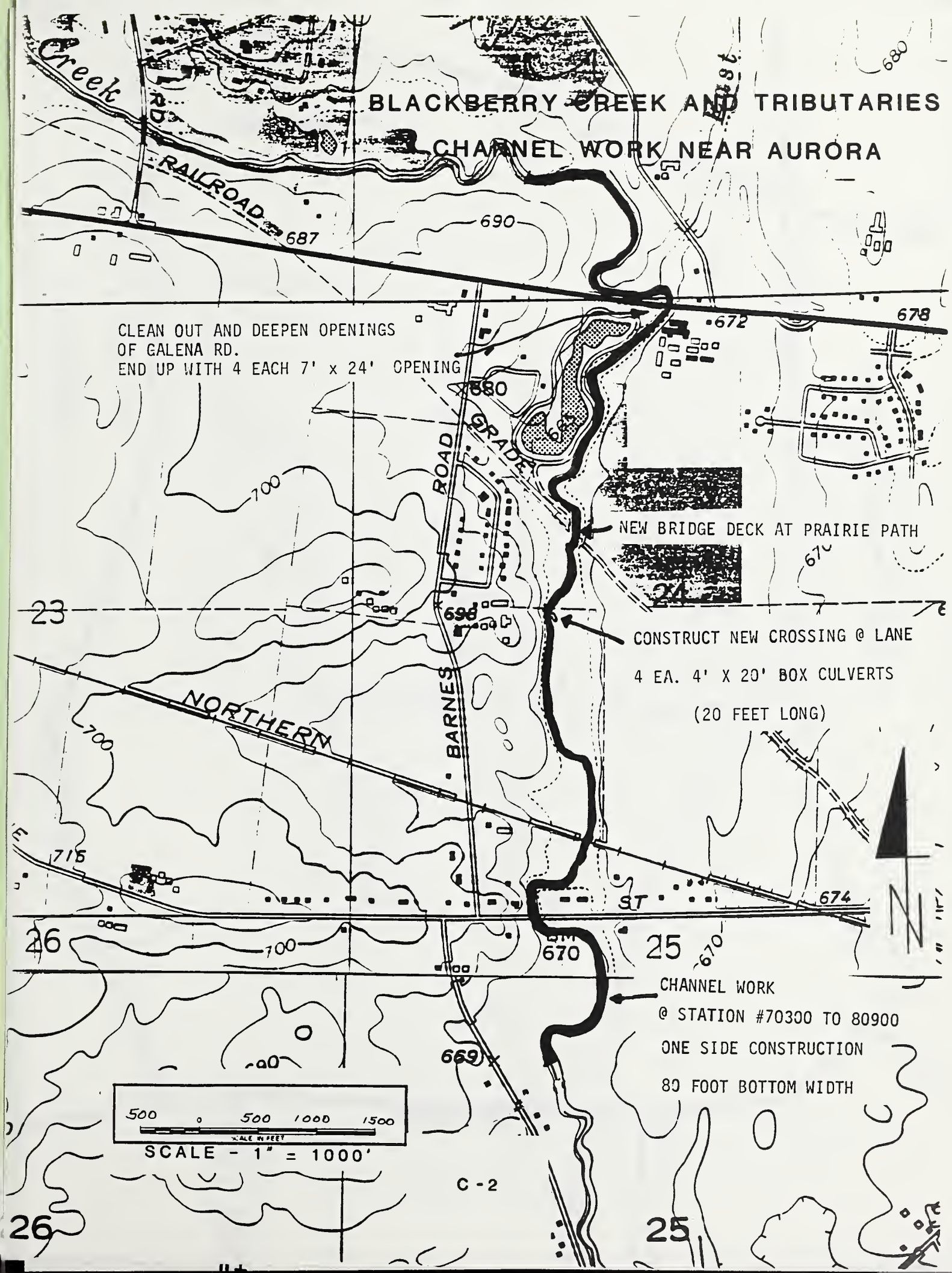
Map	Cross Section	Bottom Elev	2 Year Q	2 Year Elev	10 Year Q	10 Year Elev	100 Year Q	100 Year Elev	500 Year Q	500 Year Elev
					LATERAL D					
18	D220	738.3	190	742.8	390	743.6	690	744.4	930	744.9
18	D339	746.8	"	750.1	"	750.6	"	751.1	"	751.4
18	D486	757.0	"	764.1	"	764.9	"	765.4	"	765.8
18	D690	773.9	170	777.8	330	778.6	480	779.2	620	779.6
18	D851	785.5	"	790.8	"	792.4	"	794.0	"	796.5
18	D1116	799.5	"	801.4	"	801.7	"	802.1	"	802.5
18	D1300	805.1	"	809.3	"	809.9	"	810.1	"	810.3
					LATERAL X					
12	X055	671.0	30	676.6	60	678.0	100	679.5	130	680.5
12	X140	681.0	"	684.2	"	684.6	"	684.8	"	685.0
12	X270	681.5	"	684.2	"	"	"	"	"	"
12	X305	682.8	40	685.5	80	686.9	140	687.3	190	687.5
12	X337	683.5	"	685.7	"	687.0	"	687.5	"	687.7
12	X457	685.9	"	686.6	"	687.2	"	687.6	"	687.8
9,12	X738	683.2	150	"	300	"	500	687.7	670	687.9
					LATERAL C					
17	C340	703.5	280	708.2	560	708.9	1000	710.7	1350	712.3
17	C513	704.8	"	710.7	"	711.7	"	713.9	"	716.0
17	C846	706.8	"	714.1	"	715.0	"	716.9	"	717.6
17	C1093	711.4	300	716.9	600	717.5	1070	718.8	1440	719.3
13,17	C1584	712.7	"	720.5	"	721.8	"	722.6	"	723.3

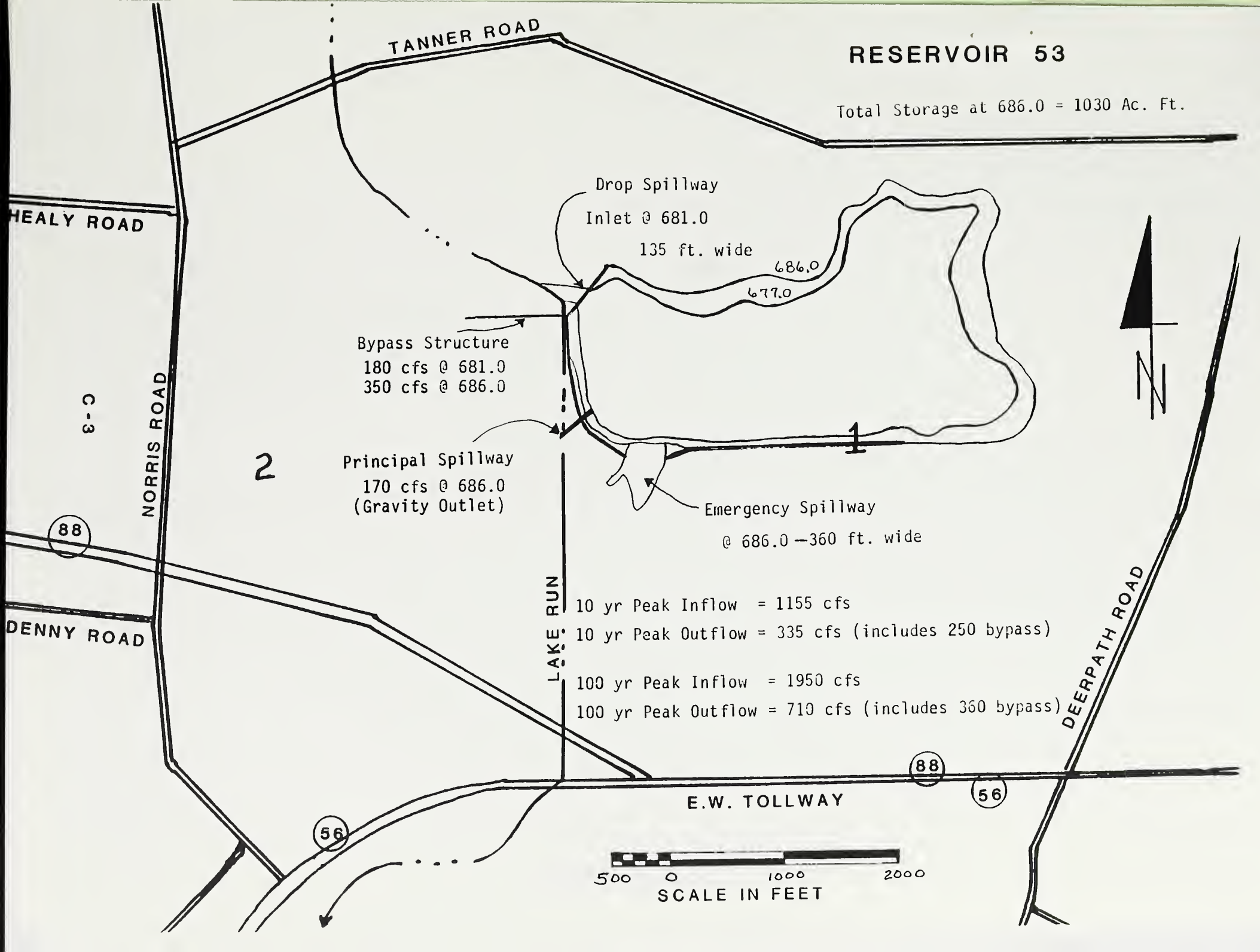
SUMMARY OF FLOOD PEAK DISCHARGES AND FLOOD CRESTS
BY VALLEY SECTIONS
BLACKBERRY CREEK

Map	Cross Section	Bottom Elev	2 Year Q	2 Year Elev	10 Year Q	10 Year Elev	100 Year Q	100 Year Elev	500 Year Q	500 Year Elev
				CHERRY HILLS OVERFLOW						
5	10000	662.0	135	664.4	310	665.2	770	666.8	1690	667.7
5	10230	661.5	"	666.0	"	667.2	"	667.7	"	668.4
5	10620	663.5	"	666.2	"	667.6	"	670.0	"	673.1
6	11320	663.5	140	666.2	310	667.6	"	670.0	1690	673.1
6	11700	664.5	145	666.7	320	668.1	800	670.1	1760	673.1
6	12580	665.5	5	666.7	50	668.1	800	670.2	1600	673.2
6	13110	666.0	"	666.8	"	668.2	850	670.3	1700	673.2
6	14460	667.5	"	668.0	55	668.8	940	671.7	1880	673.6
				MONTGOMERY OVERFLOW						
23	AA	655.0	10	655.4	45	655.8	440	656.7	1175	657.5
23	BB	656.5	"	657.0	"	657.6	"	661.4	"	661.8
23	CC	658.5	"	658.9	"	659.3	"	661.6	"	662.2
22,23	DD	658.0	"	659.0	15	659.4	480	661.7	1190	662.5
23	EE	657.0	"	659.0	"	659.5	"	661.8	"	662.6
22	FF	658.5	"	659.2	"	659.6	"	662.1	"	663.0

APPENDIX C


BLACKBERRY CREEK AND TRIBUTARIES
CHANNEL WORK NEAR WILLOWBROOK
CHANNEL WORK
@ STATION #37600 TO 44600
60 FOOT BOTTOM WIDTH
BRIDGE MODIFICATIONS
BRIDGE MODIFICATIONS
I1
N
650
651
654
500 0 500 1000 1500
SCALE 1" = 1000'
C-1
Landing
Strip


BLACKBERRY CREEK AND TRIBUTARIES
CHANNEL WORK NEAR AURORA
Creek
RD.
RAILROAD
687
690
672
678
680
CLEAN OUT AND DEEPEN OPENINGS
OF GALENA RD.
END UP WITH 4 EACH 7' x 24' OPENING
ROAD
GRADE
700
NEW BRIDGE DECK AT PRAIRIE PATH
670
23
698
CONSTRUCT NEW CROSSING @ LANE
4 EA. 4' X 20' BOX CULVERTS
(20 FEET LONG)
NORTHERN
BARNES
700
715
ST
674
26
700
670
25
670
CHANNEL WORK
@ STATION #70300 TO 80900
ONE SIDE CONSTRUCTION
80 FOOT BOTTOM WIDTH
669
500 0 500 1000 1500
SCALE - 1" = 1000'
C-2
26
25


RESERVOIR 53
Total Storage at 686.0 = 1030 Ac. Ft.
TANNER ROAD
HEALY ROAD
NORRIS ROAD
C-3
DENNY ROAD
LAKE RUN
DEERPATH ROAD
E.W. TOLLWAY
88
56
Drop Spillway
Inlet @ 681.0
135 ft. wide
686.0
677.0
Bypass Structure
180 cfs @ 681.0
350 cfs @ 686.0
Principal Spillway
170 cfs @ 686.0
(Gravity Outlet)
Emergency Spillway
@ 686.0 — 360 ft. wide
1
2
N
10 yr Peak Inflow = 1155 cfs
10 yr Peak Outflow = 335 cfs (includes 250 bypass)
100 yr Peak Inflow = 1950 cfs
100 yr Peak Outflow = 710 cfs (includes 360 bypass)
500 0 1000 2000
SCALE IN FEET

APPENDIX D

APPENDIX D

BLACKBERRY CREEK AND TRIBUTARIES
FLOODPLAIN MANAGEMENT STUDY

COST ESTIMATE

CLEAN OUT BNRR OPENING AND WIDEN BRIDGES AT CANNONBALL AND WILLOW ROAD

Item	Quantity	Unit Price	Total Price
Structural excavation	13,000 cu.yds.	$3/cu.yd.	$39,000
Enlarge bridge (add 60 ft)	2	$75,000 each	$150,000
Seed, fertilize & mulch	1 acre	$2,000/ac	2,000
			$191,000
		10% contingency	19,000
		Total	$210,000

Construction Cost	$210,000
Engr Services & Proj Admin (20%)	42,000
Land rights	
1 acre @ 2000	2,000
Total Installation Cost	$254,000
Annual Cost (.08627) =	$21,900
OM&R	1,200
Total Annual Cost	$23,100

APPENDIX D

BLACKBERRY CREEK AND TRIBUTARIES
FLOODPLAIN MANAGEMENT STUDY

COST ESTIMATE

CHANNEL PLUS 2 ENLARGED BRIDGES NEAR WILLOWBROOK (STA 37600 TO 44500)

Item	Quantity	Unit Price	Total Price
Common excavation	56,000 cu yd	$2.50/cu yd	$140,000
Enlarge bridge (add 60 ft)	2	75,000 ea	150,000
Seed, fertilize & mulch	16.5 ac	2000/ac	33,000
			$323,000
	10% Contingency		32,000
	Total		$355,000

Construction Cost	$355,000
Engr Services & proj Admin (20%)	71,000
Land Rights	
16.5 acres @ $2000/ac	33,000
16 acres @ $500/ac (spoil easement)	8,000
Total Installation Cost	$467,000
Annual Cost (.08627)	40,300
OM&R	1,800
Total Annual Cost	$ 42,100

APPENDIX D

BLACKBERRY CREEK AND TRIBUTARIES
FLOODPLAIN MANAGEMENT STUDY

COST ESTIMATE

RESERVOIR 53

Item	Quantity	Unit Price	Total Price
Common excavation	1,647,000 cu yd	$2.25/cu yd	$3,706,000
Earthfill	30,000 cu yd	$2/cu yd	60,000
Bypass pipe	50LF 91"x58"RCP	$240/LF	12,000
Outlet pipe	300LF 68"x43"RCP	$150/LF	45,000
R/Concrete	850 cu yd	$480/cu yd	408,000
Riprap	540 cu yd	$80/cu yd	43,000
Topsoil placement	678,000 sq yd	$0.50/sq yd	339,000
Seed, fertilize & mulch	145 ac	2000/ac	290,000
			$4,903,000
		10% Contingency	492,000
		Total	$5,395,000

Construction Cost	$5,395,000
Engr Services & proj Admin (20%)	1,079,000
Land Rights	
145 acres @ $1000/ac	145,000
40 acres @ $300/ac	12,000
Total Installation Cost	$6,631,000
Annual Cost (.08627)	572,000
OM&R	8,100
Total Annual Cost	$ 580,100

Note: The 40 acres are for placement of spoil and will be returned to the original owner after construction.

APPENDIX D

BLACKBERRY CREEK AND TRIBUTARIES
FLOODPLAIN MANAGEMENT STUDY

COST ESTIMATE

BLACKBERRY CHANNEL (10,600FT) STA 70300 TO 80900

Item	Quantity	Unit Price	Total Price
Channel excavation	126,000 cu yd	$2.25/cu yd	$284,000
New bridge at Prairie Path (sta 76300)	1 ea	LS	90,000
New box culverts	1 ea	LS	64,000
Seed, fertilize & mulch	35 ac	2000/ac	70,000
			$508,000
	10% Contingency		51,000
	Total		$559,000

Construction Cost	$559,000
Engr Services & proj Admin (20%)	112,000
Land Rights	
35 acres @ $1500/ac (channel)	52,500
30 acres @ $500/ac (spoil easement)	15,000
Total Installation Cost	$738,500
Annual Cost (.08627)	63,700
OM&R	2,300
Total Annual Cost	$ 66,000

APPENDIX D

BLACKBERRY CREEK AND TRIBUTARIES
FLOODPLAIN MANAGEMENT STUDY

COST ESTIMATE

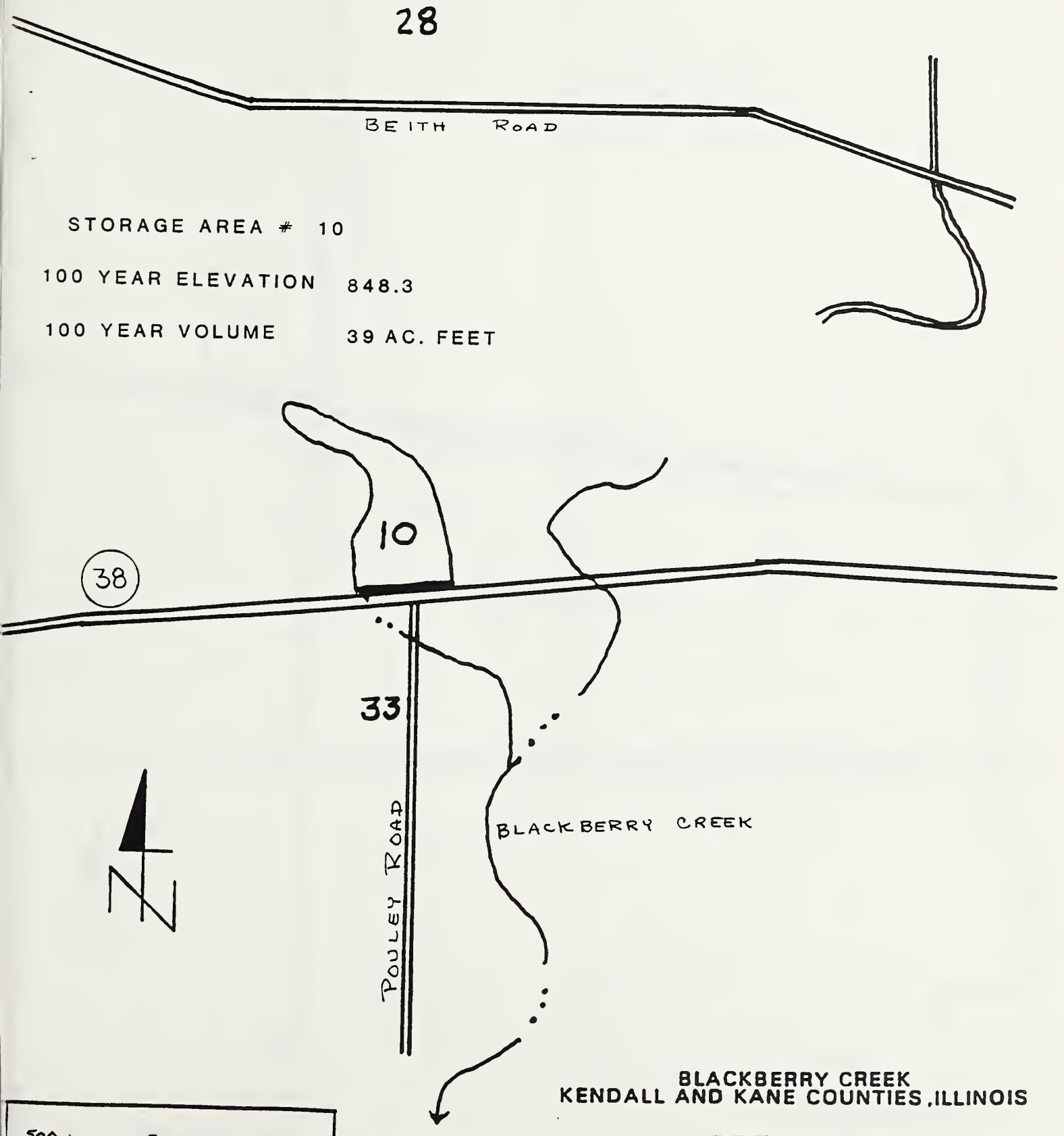
FLOODPROOFING 11 BUILDINGS

Item	Quantity	Unit Price	Total Price
Remove existing vegetaton	11 locations	$500/site	$5,500
Earthfill	2750 cu yd	$8/cu yd	22,000
Seeding/landscaping	11 locations	$2000/si	22,000
			$ 50,500
	10% Contingency		5,000
	Total		$ 55,500

Construction Cost	$55,500
Engr Services & proj Admin (20%)	11,400
Land Rights $50/site	550
Total Installation Cost	$67,450
Annual Cost (.08627)	5,800
OM&R	500
Total Annual Cost	$ 6,300

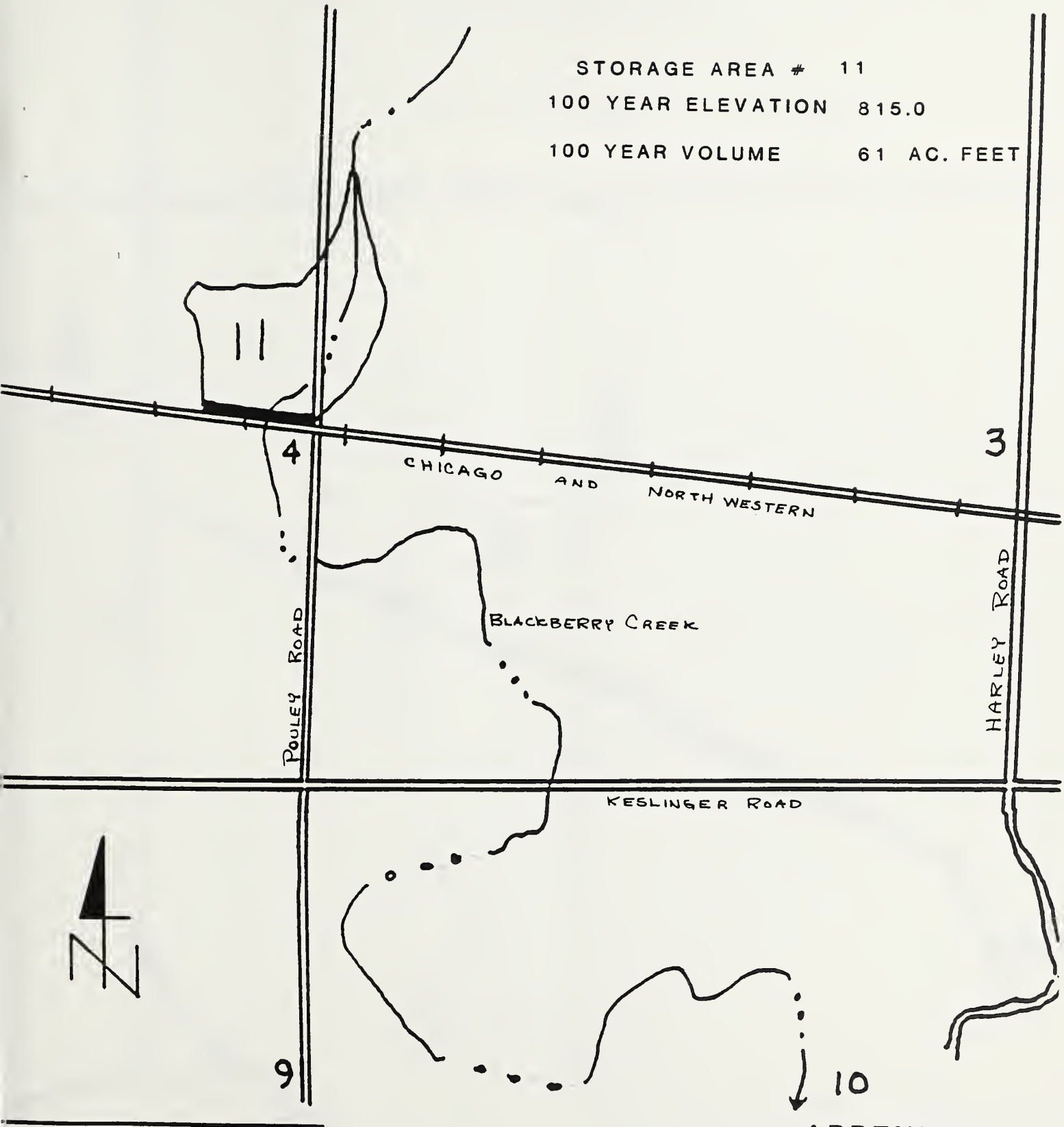
14.14

APPENDIX E



BLACKBERRY CREEK
KENDALL AND KANE COUNTIES, ILLINOIS

APPENDIX E



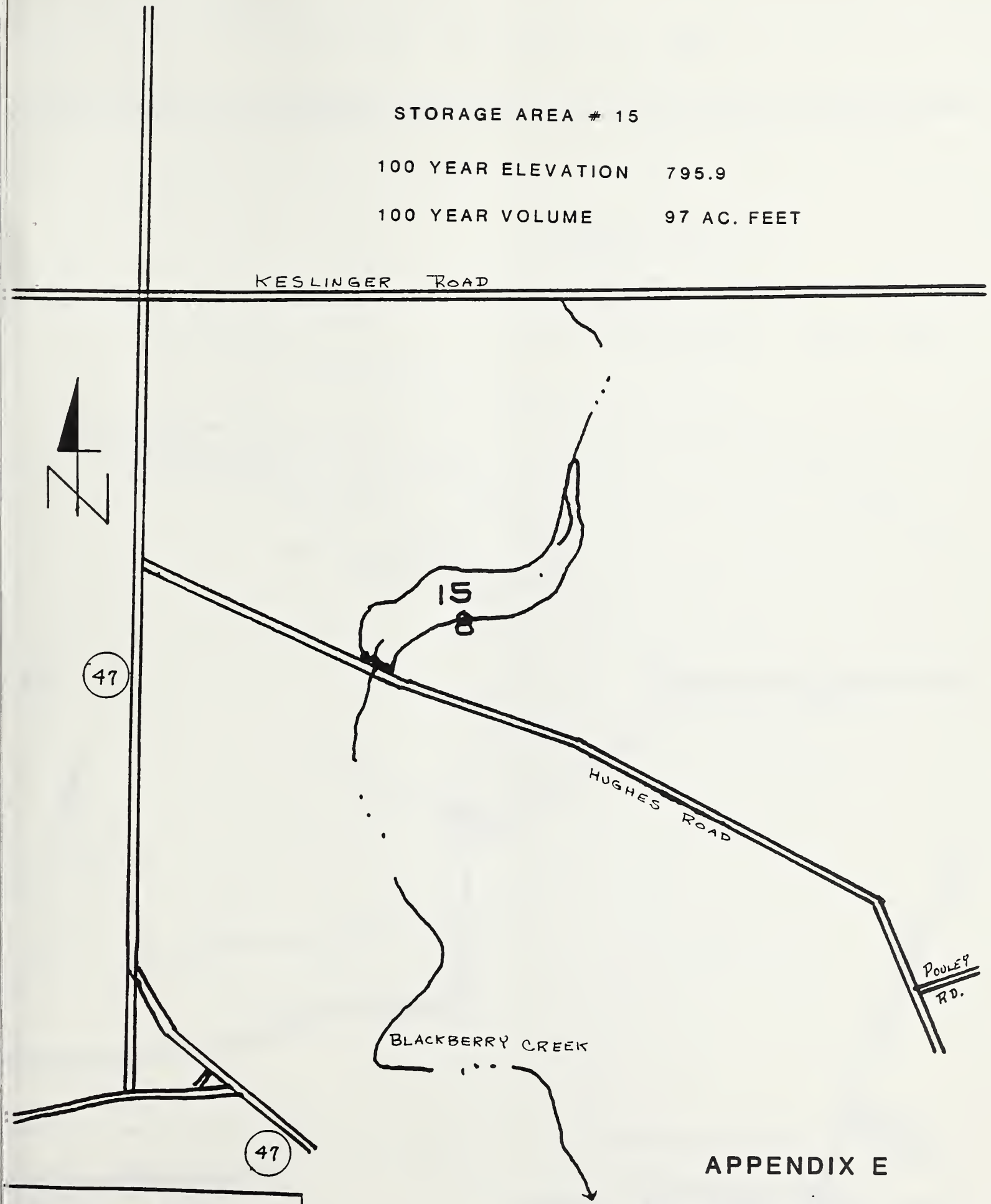
APPENDIX E

BLACKBERRY CREEK
KENDALL AND KANE COUNTIES, ILLINOIS

STORAGE AREA # 15

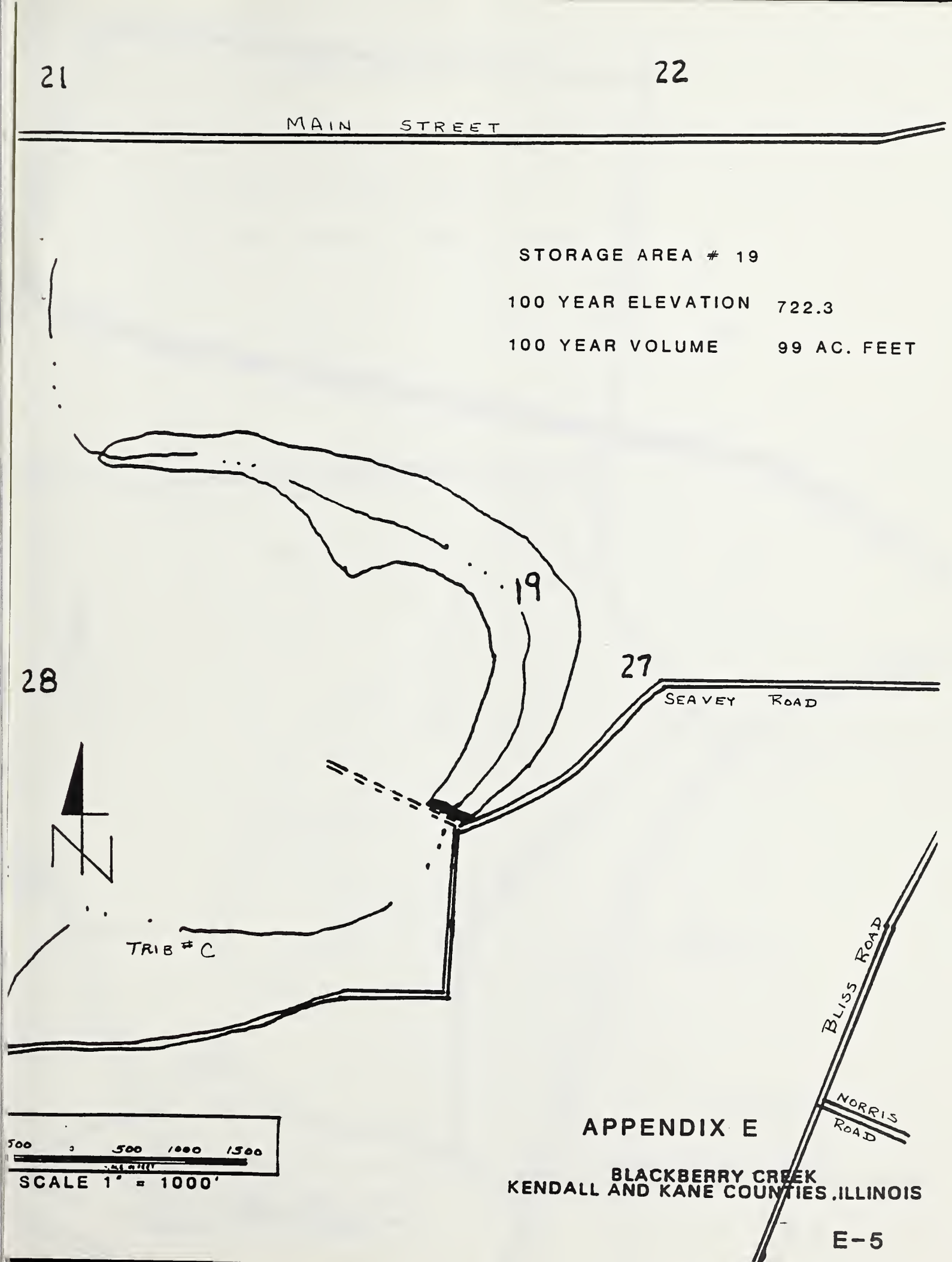
100 YEAR ELEVATION 795.9

100 YEAR VOLUME 97 AC. FEET



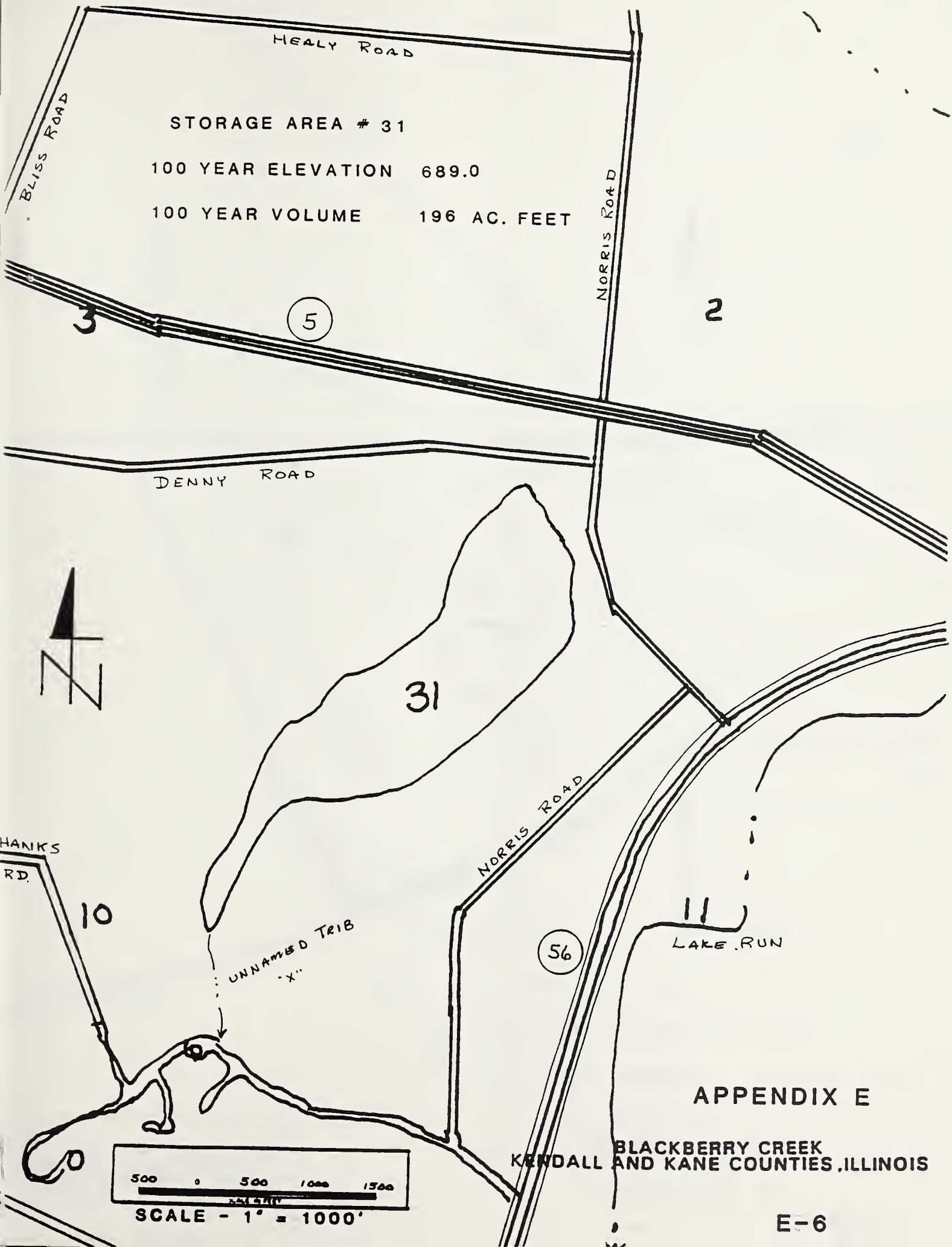
APPENDIX E

BLACKBERRY CREEK
KENDALL AND KANE COUNTIES, ILLINOIS



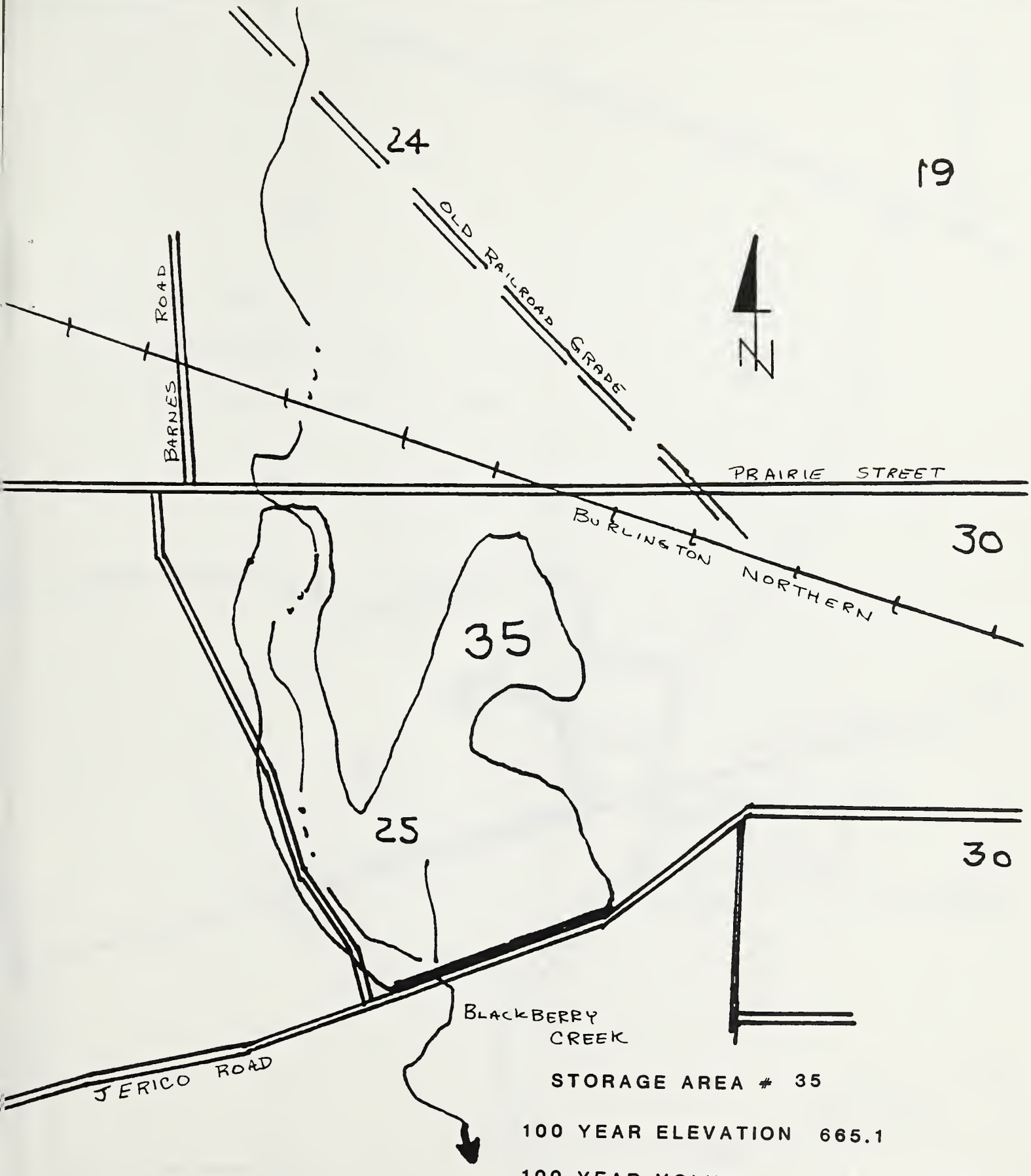
APPENDIX E

BLACKBERRY CREEK
KENDALL AND KANE COUNTIES, ILLINOIS



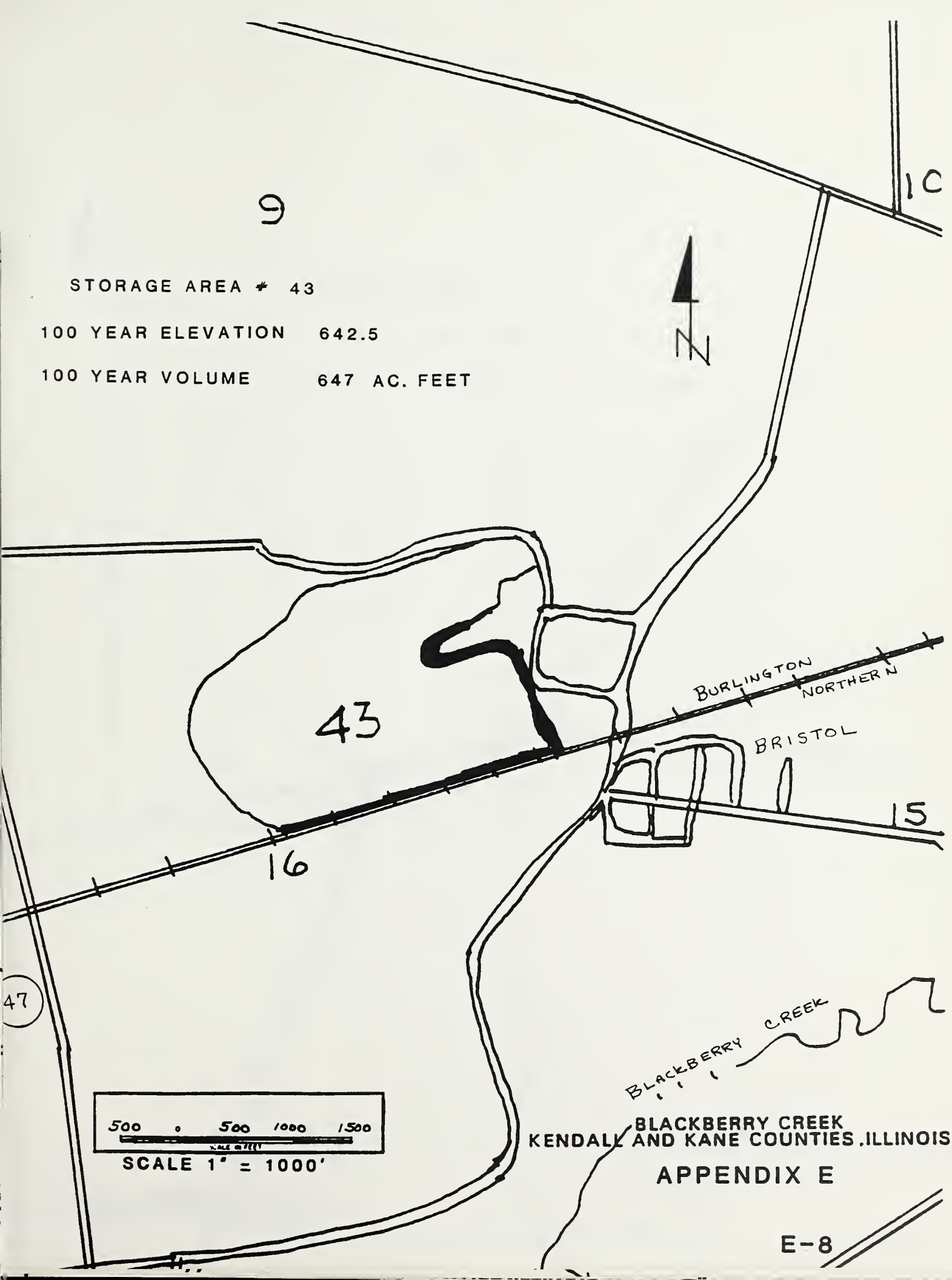
APPENDIX E

BLACKBERRY CREEK
KENDALL AND KANE COUNTIES, ILLINOIS



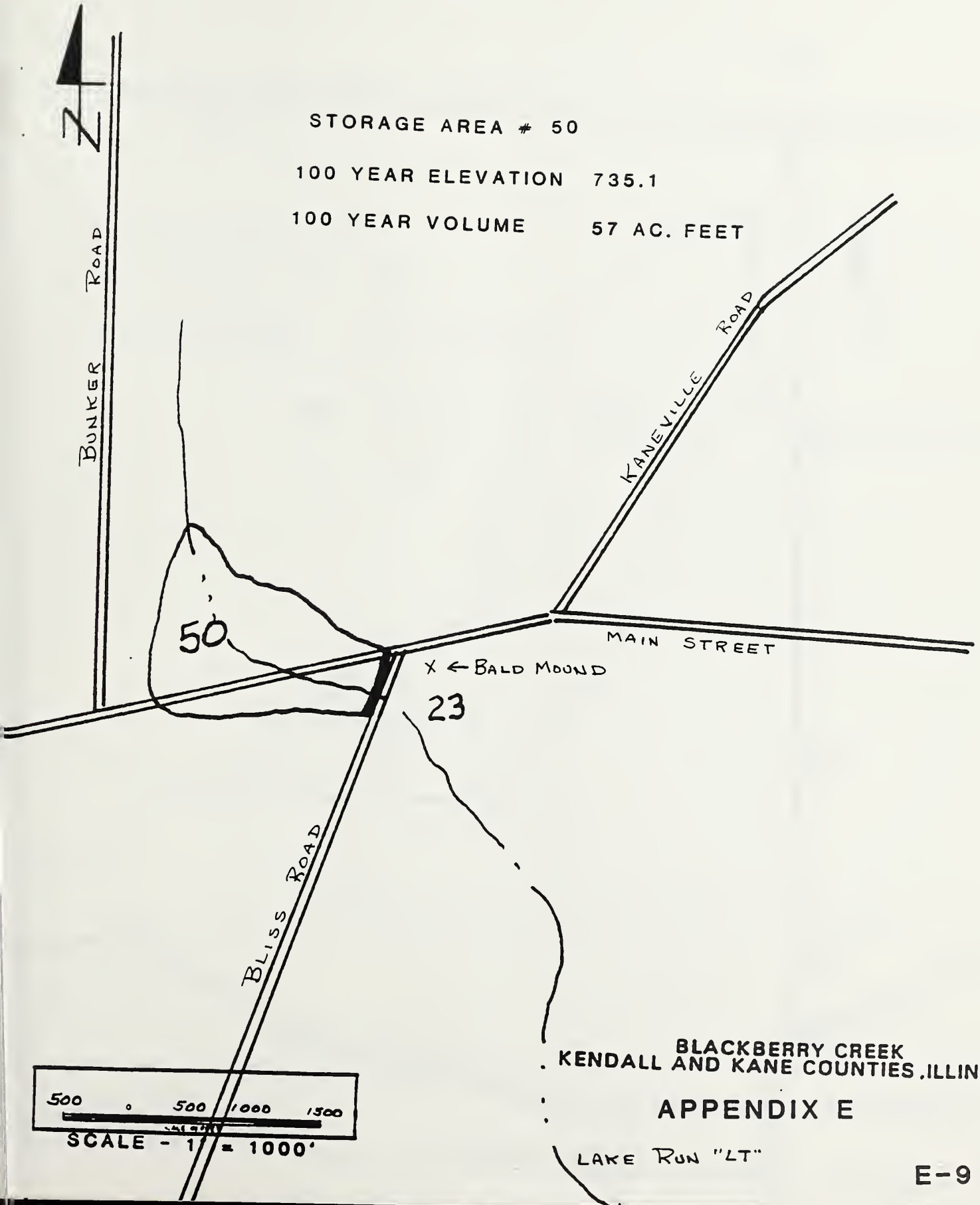
BLACKBERRY CREEK
KENDALL AND KANE COUNTIES, ILLINOIS

APPENDIX E



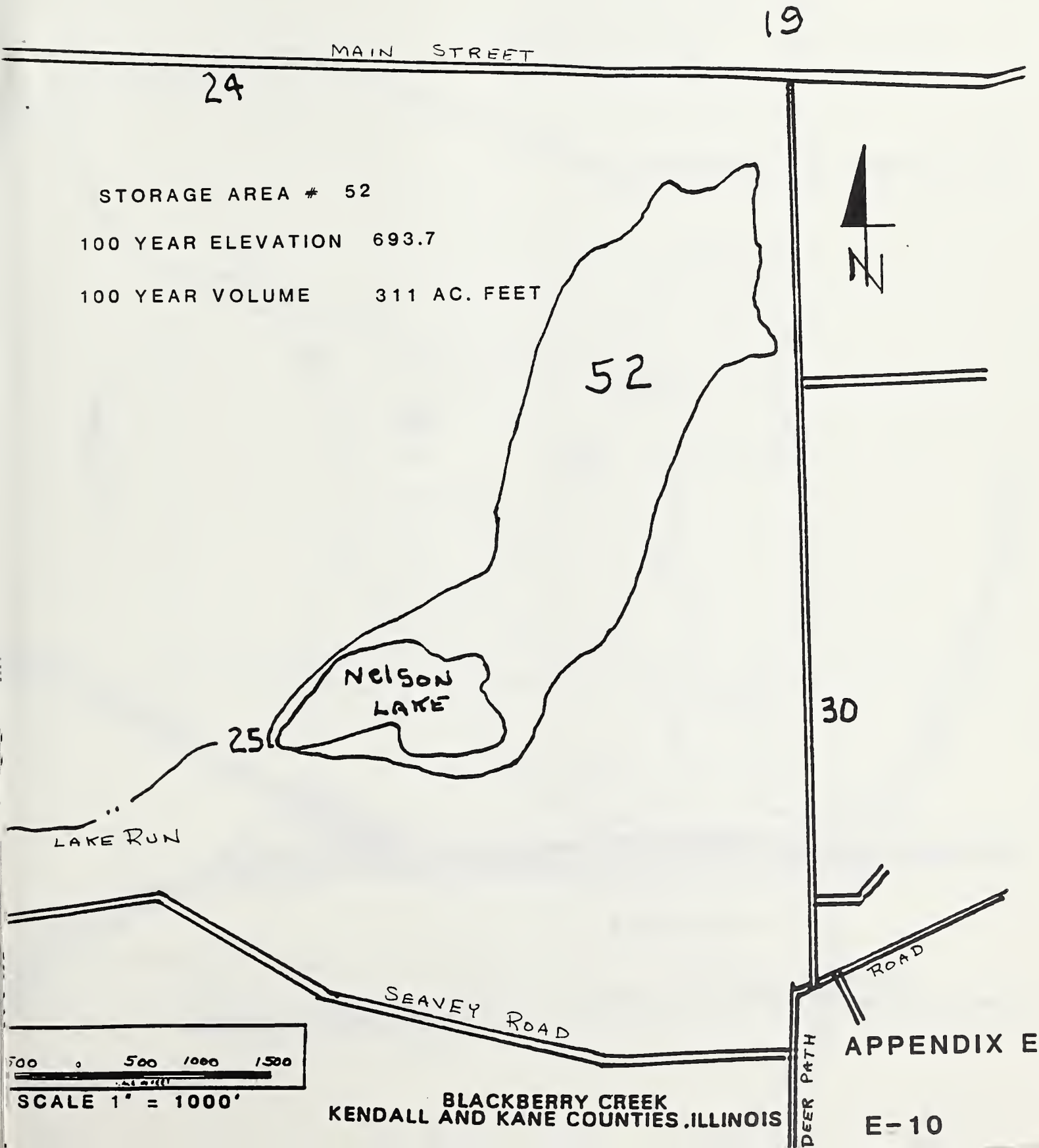
BLACKBERRY CREEK
KENDALL AND KANE COUNTIES, ILLINOIS

APPENDIX E



BLACKBERRY CREEK
KENDALL AND KANE COUNTIES, ILLINOIS

APPENDIX E

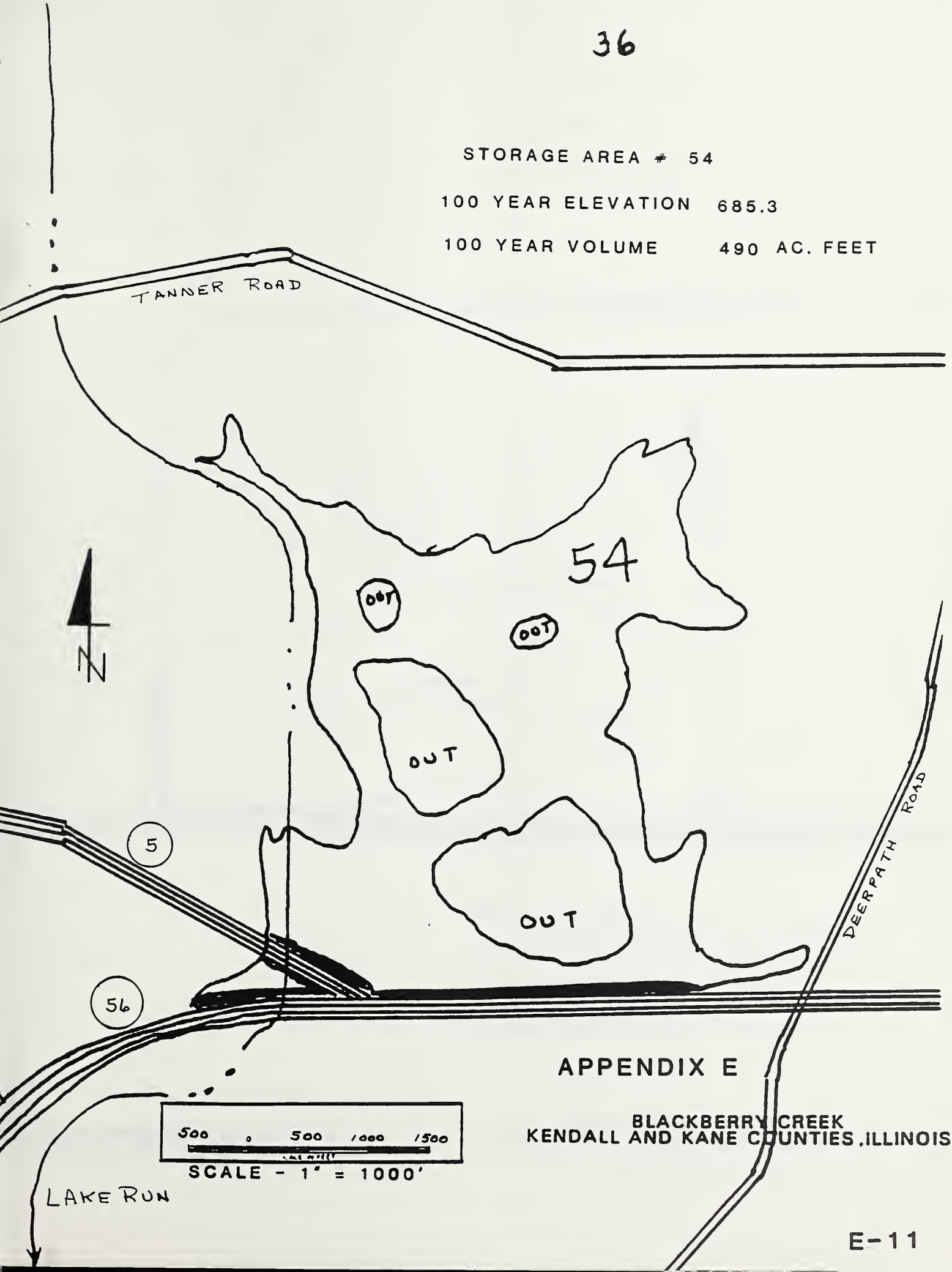


BLACKBERRY CREEK
KENDALL AND KANE COUNTIES, ILLINOIS

STORAGE AREA # 54

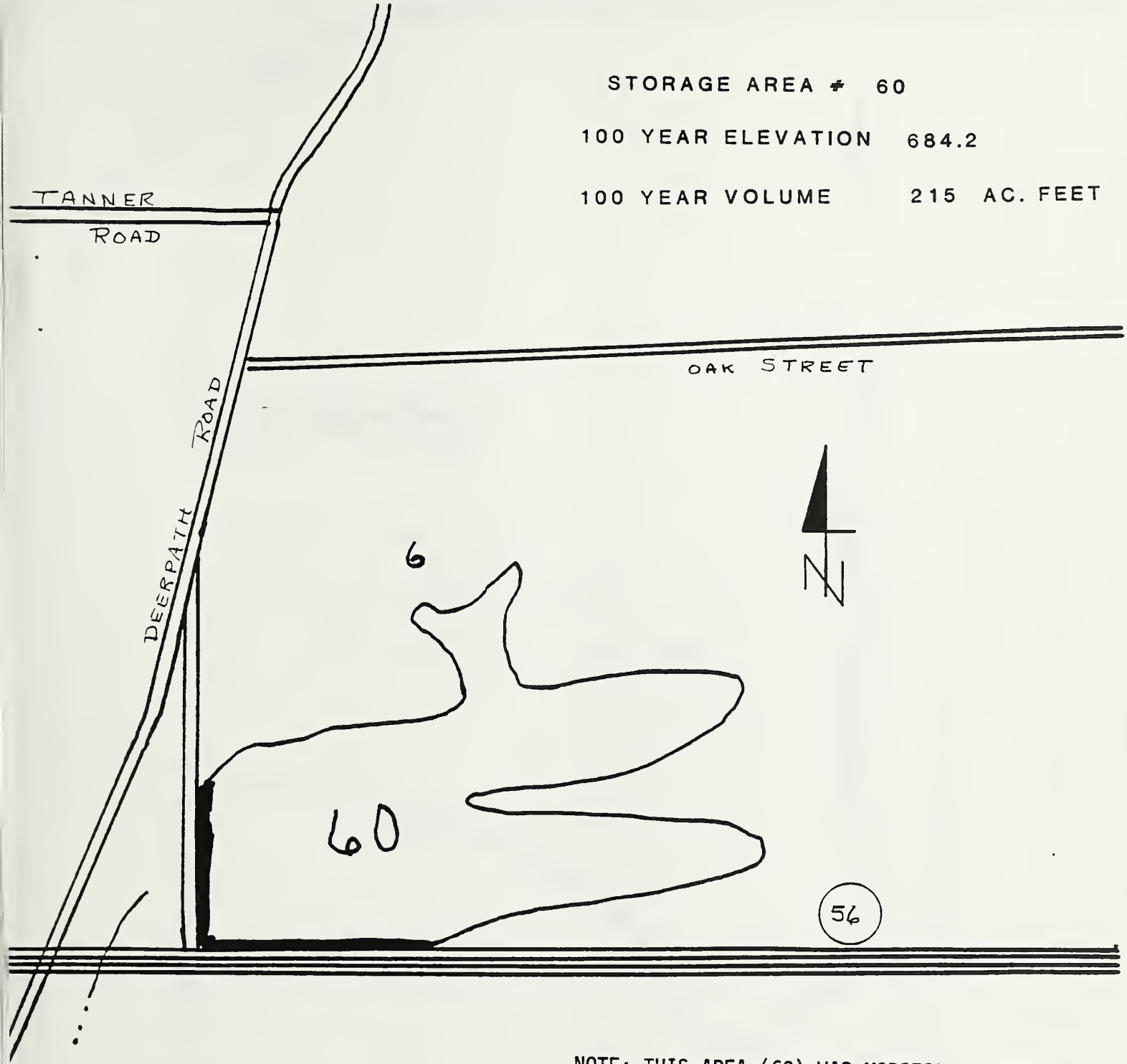
100 YEAR ELEVATION 685.3

100 YEAR VOLUME 490 AC. FEET



APPENDIX E

BLACKBERRY CREEK
KENDALL AND KANE COUNTIES, ILLINOIS



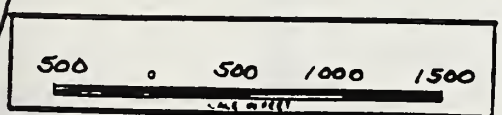
STORAGE AREA # 60

100 YEAR ELEVATION 684.2

100 YEAR VOLUME 215 AC. FEET

EAST RUN

NOTE: THIS AREA (60) WAS MODIFIED DURING CONSTRUCTION OF ORCHARD ROAD INTERCHANGE SO 100 YEAR ELEVATION MAY BE HIGHER BEFORE 215 ACRE FEET ARE STORED.

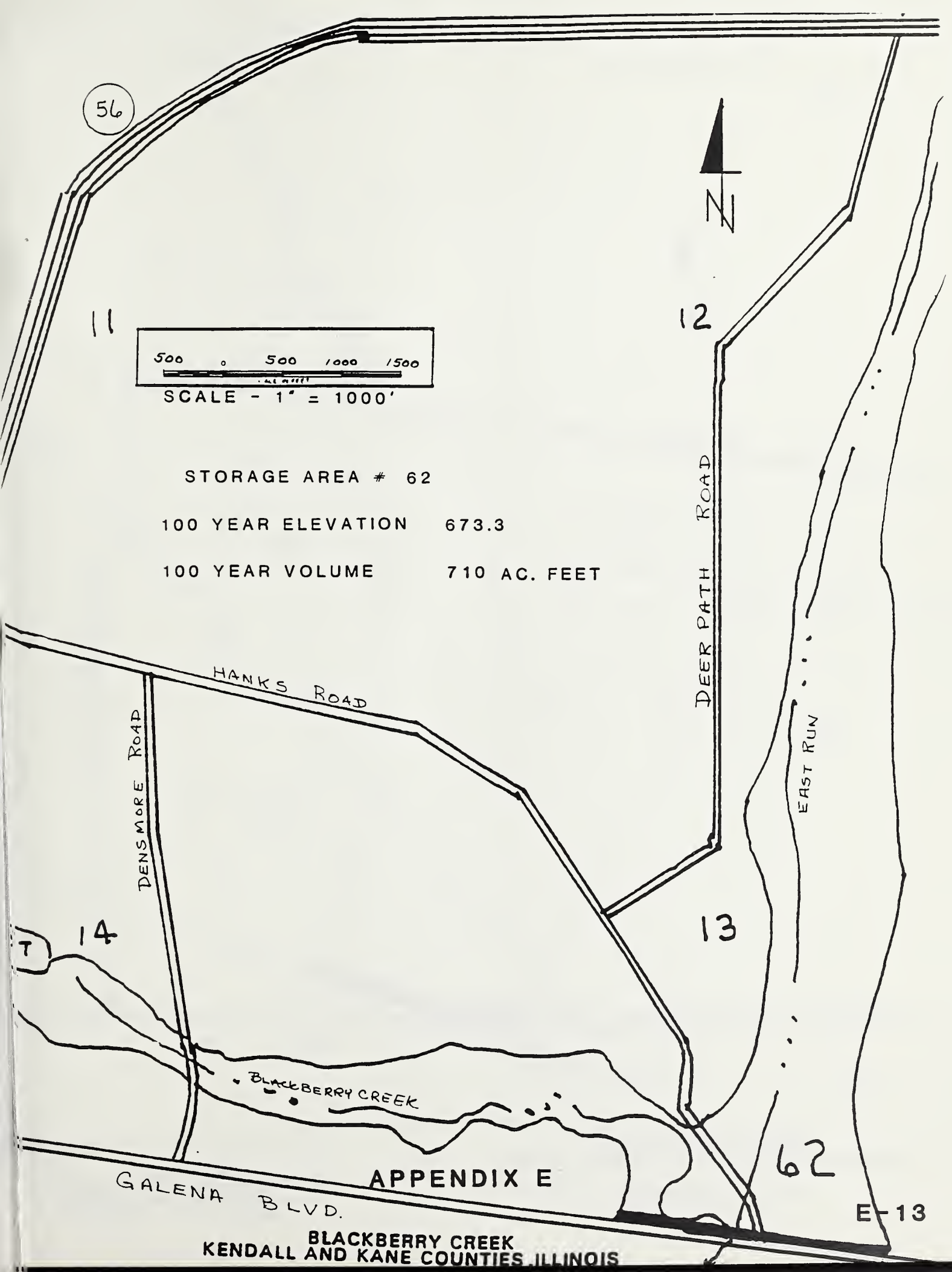


7

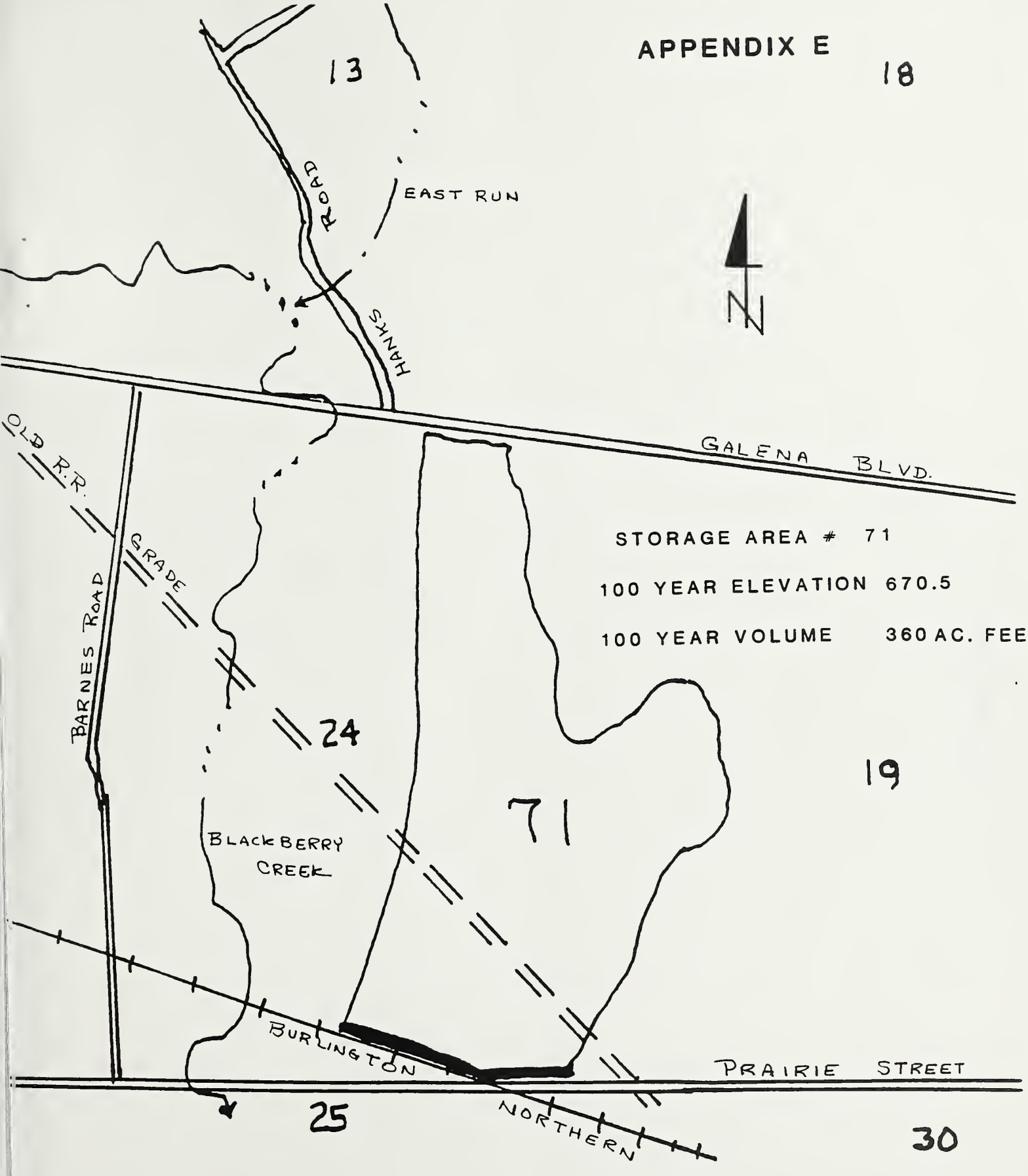
BLACKBERRY CREEK
KENDALL AND KANE COUNTIES, ILLINOIS

8

APPENDIX E



BLACKBERRY CREEK
KENDALL AND KANE COUNTIES, ILLINOIS

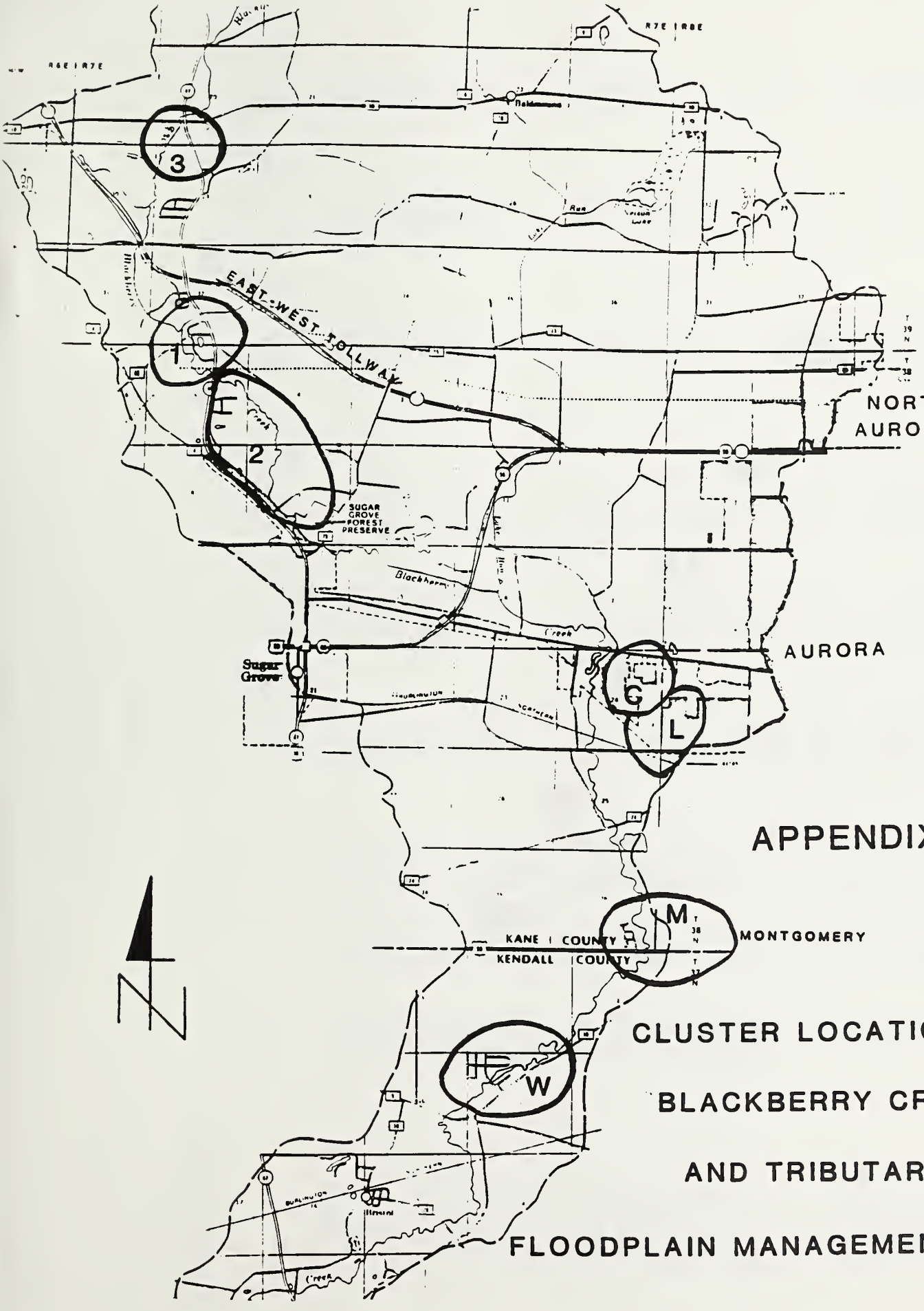


500 0 500 1000 1500

SCALE - 1" = 1000'

BLACKBERRY CREEK
KENDALL AND KANE COUNTIES, ILLINOIS
APPENDIX E

APPENDIX F



APPENDIX F

CLUSTER LOCATION MAP

BLACKBERRY CREEK

AND TRIBUTARIES

FLOODPLAIN MANAGEMENT STUDY

APPENDIX F
BLACKBERRY CREEK FLOODPLAIN MANAGEMENT STUDY
BUILDING AND FLOOD WATER ELEVATIONS

Location: Blackberry Creek near Willowbrook
Cluster W

BUILDING IDENTIFICATION		BUILDING ELEVATION			FLOOD WATER ELEVATION					
					Present Runoff Conditions			Future Runoff Conditions		
Eval. Number	Street Address	Channel Station	First Floor	Low Water Entry	10% chance 10 year	1%chance 100 year	0.2% chance 500 year	10% chance 10 year	1% chance 100 year	0.2% chance 500 year
W-1	'7 Galena	49300	659.2	659.3	653.9	654.7	655.1	654.0	654.8	655.2
W-2	garage	45700	650.8	650.9	652.1	653.0	653.4	652.2	653.0	653.4
W-3	ialena	45600	659.6	657.9	652.0	652.9	653.3	652.2	653.0	653.4
W-4	n	44470	656.0	656.1	651.3	652.1	652.6	651.4	652.2	652.6
W-5	age	43640	652.8	652.9	650.8	651.7	652.1	651.0	651.8	652.1
W-6	Willow Ln	42600	651.6	651.7	649.7	651.1	651.5	649.8	651.1	651.5
W-7		42500	651.6	651.7	649.6	651.0	651.4	649.6	651.0	651.5
W-8	Willow Ln	42500	650.[illegible]	650.4	649.6	651.0	651.4	649.6	651.0	651.5
W-9	Willow Ln	42500	651.[illegible]	652.0	"	"	"	"	"	"
W-10	Willow Ln	42500	652.2	652.3	"	"	"	"	"	"
W-11	Willow Ln	42575	654.8	652.0	"	"	"	"	"	"
W-12	Lakespur	42175	651.2	650.8	649.4	650.8	651.3	649.5	650.8	651.3
W-13	Lakespur	42000	650.5	650.6	"	"	"	649.5	650.8	651.3
W-14	Lakespur	41600	650.0	650.1	649.0	650.6	651.1	649.2	650.6	651.1
W-15	Willow Ln	42800	651.7	651.8	650.5	651.2	651.7	650.7	651.4	651.7
W-16	Willow Ln	42940	653.2	653.3	650.6	651.4	651.8	"	"	"
W-17	Park Ln	43040	653.1	653.2	650.6	651.4	651.8	"	"	"
W-18	'ark Ln	42800	651.6	651.7	650.5	651.2	651.7	"	"	"
W-19	Park Ln	42940	651.8	651.7	650.6	651.4	651.8	"	"	651.8
W-20	Park Ln	43140	651.5	651.6	650.7	651.5	651.9	650.8	651.5	651.9
W-21	Park Ln	43340	652.7	652.8	650.8	651.6	652.0	650.8	651.6	652.0
W-22	Cypress Dr	43420	654.3	654.4	"	651.7	"	650.9	"	"
W-23	Cypress Dr	43520	652.7	652.8	"	"	652.1	"	"	652.1
W-24	Cypress Dr	43620	652.6	652.4	650.8	651.7	652.1	651.0	651.8	652.1
W-25	Cypress Dr	43720	652.5	651.8	650.9	651.7	652.2	651.1	651.8	652.2
W-26	Cypress Dr	43920	654.2	654.3	651.1	651.8	652.3	"	"	652.3
W-27	Cypress Dr	43920	654.2	654.3	"	"	"	"	"	"
W-28	Cypress Dr	44120	654.3	654.4	"	651.9	652.4	651.2	651.8	652.4
W-29	Cypress Dr	44120	653.8	653.9	651.1	651.9	652.4	651.2	651.8	652.4
W-30	Cypress Dr	43920	652.0	652.1	651.1	651.8	652.3	651.1	651.8	652.3

APPENDIX G

APPENDIX G
INVESTIGATIONS AND ANALYSIS

Surveys and Mapping

All surveys were performed by the State of Illinois, Department of Transportation, Division of Water Resources (DWR) as part of its contribution as co-sponsors of this study. Detailed surveys included valley cross sections and centerline of roads along with bridge and culvert dimensions for use in analyzing hydraulic characteristics. They also obtained first floor and low water entry elevations for 316 residences, businesses and related structures for use in flood damage analysis.

Detailed topographic maps prepared by IDOT-DWR with 1 inch = 200 feet scale and 2 foot contour interval were used for the initial evaluation of the floodprone areas. DWR provided detailed ortho photo maps in 1987 for the Montgomery, Willowbrook and Waubonsee College areas. In 1984, the City of Aurora started obtaining orthophotographic background topographic maps for all land in their domain. These maps were prepared at a scale of one inch = 100 feet with one foot contour intervals. The available city maps were used to define drainage patterns, storage volumes, and to define limits of the floodplain.

Hydrology

Hydrologic modeling for this study was completed through the use of the SCS Computer Program for Project Formulation (Technical Release 20, Reference 8). This program is an advanced hydrologic model which simulates flood stages and discharges. The stages and discharges are related to watershed characteristics such as drainage area, hydrologic soil group, land use and cover, time of concentration, and channel and floodplain hydraulic characteristics. Given these characteristics and rainfall amounts, the model develops hydrographs for local drainage areas and performs a specified series of channel and reservoir routings as well as hydrograph additions. The result is peak discharges, hydrograph shape, and runoff volumes at specified locations throughout the watershed.

The present condition model for this study was based on 1987 land use in the watershed area and was checked for reasonableness against the historic flood of 1983. The model is based on the SCS type 2 storm distribution with twenty-four hour rainfall values as presented in Technical Paper 40, US Department of Commerce - Weather Bureau, May 1961.

The future condition model, for the year 2005, was developed by modifying runoff curve numbers and times of concentration to reflect increased urban development. Based on input from local governments and the steering committee the future condition model also incorporates the installation of on-site detention basins on all new development which store 2.0 inches of runoff from the development and releases the water at a rate of 0.15 cfs per acre of newly developed land draining into the basin. Once the inflow exceeds the storage capacity of the basin the outflow was estimated to be 2 cfs/acre for the first foot above the capacity of the basin. Beyond that elevation a large cfs/acre was used to indicate no storage effect on these flows.

The areas that were included as developed in 2005 were based on existing zoning maps of Kane and Kendall Counties and the communities involved along with input from the steering committee on the areas likely to develop.

The future condition model assumes that all existing natural storage, approximately 3900 acre-feet, is being maintained in the watershed. See Appendix E for the location of significant storage areas. According to the City of Aurora, they require compensatory storage when new development is located in floodprone areas.

An evaluation of the gauge records near Yorkville indicates that average discharge in the stream has increased significantly over the last 15 years. This could be due to several causes but changed land use probably is a significant cause. This watershed contains significant valley storage along with the previously identified storage areas. Overall this results in much lower peak flows than one would expect from a 70 square mile drainage area.

Hydraulics

An analysis of the hydraulic characteristics of the creek was carried out to provide stage estimates for floods of selected recurrence intervals. The water surface elevations (stage) were established utilizing the physical characteristics of the channel including channel size and shape, floodplain size and shape, bridge sizes and shapes, and estimates of Manning's roughness coefficients. The hydraulic computations were made using the SCS Hydraulic Model WSP-2 (Technical Release 61, Reference 9). This model employed the standard step method for backwater profiles which is a computational procedure that estimates total energy at each stream cross section accounting for friction losses between sections. The bridge effects on stream hydraulics were accounted for using the Bureau of Public Roads Method. The bridge method, which is included in WSP-2, was formulated using the principle of conservation of energy. The model employs this principle between the point of maximum backwater upstream from the bridge and a point downstream from the bridge at which normal stage has been established. Culverts were also evaluated using the principle of conservation of energy and depth of headwater and tailwater, the barrel shape and dimensions, type of inlet, and shape of headwall.

The hydraulic model requires the input of peak discharges in addition to the physical characteristics listed above. The peaks were taken from the hydrologic model at appropriate locations. Starting configuration was based on estimated water surface elevations of the Fox River. Manning's roughness coefficients were estimated on the basis of field observations using the SCS procedures (Reference 11). All elevations are based on the National Geodetic Vertical Datum.

The floodway was determined for Blackberry Creek, Lake Run, East Run, Trib C, and Trib D. It was computed on the basis of equal conveyance reduction from each side of the floodplain using the SCS Floodway Computer Program (Technical Release 64, Reference 10).

Flood Damage Analysis

The economic data for floodwater damages for this study was gathered by personal interviews with floodplain residents during the fall of 1987. Data regarding damages to personal property, business property, loss of income, and the effects of flooding to safety and health was gathered. The final economic evaluation of personal property losses from floodwater was done by use of the Urban Floodwater Damage Economic Evaluation program (URB 1), (Reference 15).

Properties within the floodplain were classified by major type that included basement structures, slab on grade, bi-level, tri-level, apartment, commercial and industrial. Engineering surveys were conducted to determine low water entry point, basement elevation and first floor elevations for each property. Coefficient damage curves published by the Federal Insurance Administration (FIA) and from the other urban studies were used in the URB 1 program to compute damages for each property. Occasionally these were adjusted to correlate with interview data. The coefficient damage curves represent percent damage factors by flood depth for buildings and contents of respective houses or other types of buildings. The URB 1 program locates each property based upon surveyed location and computes damages based upon frequency and depth of flooding related to the damage factors for that respective property.

The program lists the properties damaged for each alternative, and includes the following items for each property.

a) damage to property (building) by each storm
b) damage to contents
c) sum of property (building) and contents damage by each storm
d) sequence number listing of buildings
e) frequency of each damaging storm in flood series
f) total (building and contents) average annual damage for the property
g) flood elevation for each damaging storm
h) depth of flood in relation to first floor of building
i) frequency damages begin
j) computation of average annual damages for property and contents

Example of URB 1 output.

HOUSE NO. 44 STATION: 43125 (SECTION: B4432 STATION: 44320)
CCF-CAMG: C

PROPERTY DAMAGE	CONTENTS DAMAGE	PROPERTY & CONTENTS	PCT PROB	FLOOD ELEV	TO 1ST FLOOR	AVG. ANN. DAMAGE PROPERTY	CONTENTS	TOTAL
75000	37500	112500	VAL					
13720	10196	23866	0.2	651.76	0.76	27	20	47
10436	6628	17064	1.0	651.48	0.48	97	67	164
8001	4019	12020	2.0	651.27	0.27	92	53	145
0	0	0	3.2	651.10	0.10	46	23	69
				TOTAL AVG. ANN.		262	163	425

The effects of floodwater damages were evaluated for present conditions, future without project, and several structural components.

All damage estimates were based upon current values (1987 price base). Damages from increased values of floodplain property due to expansion of existing facilities or the construction of new units were not evaluated.

Public Involvement

This study was intiated following the flood of 1983. The local people contacted the Illinois Division of Water Resources requesting that something be initiated to solve the flooding problem. The information provided by the local people indicated that the flooding in the area of Cherry Hills and Willowbrook was increasing as new development occurred. Also, Montgomery was concerned about the overflow from Blackberry Creek that occurred in 1983.

The steering committee that was formed to provide guidance for this study included representatives from the local governments as well as representatives of interested organizations such as the IDOT, Division of Highways, homeowners associations, City of Aurora, Kane County and Kendall County. Interviews with private citizens were done to ascertain frequency of flooding.

Meetings were held with this group to check reasonableness of the model. Possible alternatives were pointed out by the committee in 1986 and 1987. Appendix C shows the evaluated structural measures. None were found to approach a 1:1 benefit cost ratio which is required for federal funding.

14.14